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p. 107, running head: *For* 1917 read 1967
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p. 114, line 35: *For* Wyvombe read Wycombe
p. 114, line 24 up: *For* stage read stag
p. 129, line 27 up: *For* Newton, Miss Martha, E. Shaw Bank read Newton, Miss Martha E., Shaw Bank
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CONTENTS

PAGES

DISTRIBUTION, DATES OF ORIGIN AND ACREAGE OF *Spartina townsendii* (*s.l.*) MARSHES IN GREAT BRITAIN. By J. C. E. HUBBARD and R. E. STEBBINGS 1–7

TRUE SERVICE TREES OF WORCESTERSHIRE. By AUGUSTA PATON 9–13

A KEY TO THE IDENTIFICATION OF THE MALE FLOWERS OF BRITISH DIOECIOUS SPECIES. By R. TINKLIN 15–17

THREE SPECIES OF *Sigesbeckia* IN BRITAIN. By R. K. BRUMMITT 19–21

SUPPLEMENT TO A GUIDE FOR LOCAL FLORA WRITERS. Compiled by FRANKLYN PERRING 23–24

PLANT NOTES 25–26

PLANT RECORDS. Compiled by E. C. WALLACE 27–32

ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 33–64

BOOK REVIEWS 65–66

OBITUARY 67–69

EXHIBITION MEETING, 1966 71–84

REPORTS

REPORT OF THE COUNCIL FOR 1966 85–88

TEESDALE DEFENCE COMMITTEE 89

IRISH REGION REPORT FOR 1966 89

WELSH REGION REPORT FOR 1966 89–90

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA: TWELFTH ANNUAL REPORT TO 31ST DECEMBER 1966 90–91

FIELD MEETING 91–100

PERSONALIA AND NOTICES TO MEMBERS 101–104

INSTRUCTIONS TO CONTRIBUTORS 105–106

LIST OF MEMBERS AND SUBSCRIBERS 107–141

A BROAD-LEAVED VARIETY OF *Festuca rubra* L. By A. J. WILLIS and SYLVIA M. KING 143–149

A GLABROUS PERENNIAL *Sonchus* IN BRITAIN. By J. E. LOUSLEY 151–157

A NOTE ON WISTMANS WOOD, DARTMOOR. By P. J. M. GREENSLADE .. 159–163

Neotinea intacta (LINK) REICHB. F. IN THE ISLE OF MAN. By D. E. ALLEN .. 165–168

THE BRITISH HERBARIUM OF FLOWERING PLANTS AND FERNS AT THE CITY OF LIVERPOOL MUSEUMS. By E. F. GREENWOOD 169–172

SPIRAL SHOOTS IN THE GREAT HORSETAIL, *Equisetum telmateia* EHRH. By C. N. PAGE 173–176

FURTHER NOTES ON *Erica ciliaris* IN IRELAND. By DAVID MCCLINTOCK .. 177–178

OAK WOODS AND BIRCH WOODS 179–187

PLANT NOTES 189–194

PLANT RECORDS. Compiled by E. C. WALLACE 195–199

ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 201–290

OBITUARY 291–292

REPORTS

ANNUAL GENERAL MEETING, 29TH APRIL, 1967 293–295

REPORT OF THE WELSH REGION AUTUMN MEETING, 1967 295–296

FIELD MEETINGS, 1967 297–304

PERSONALIA AND NOTICES TO MEMBERS 305–308

INSTRUCTIONS TO CONTRIBUTORS 309–310

THE B.S.B.I. IN A CHANGING BRITAIN. PRESIDENTIAL ADDRESS 1968 by J. G. DONY 311–323

CONTENTS

A RAILWAY FLORA OF RUTLAND. By K. G. MESSENGER 325–344
THE FLORA OF INISHBOFIN AND INISHSHARK. By D. A. WEBB and J. HODGSON 345–363
PLANT RECORDS FROM MULL AND THE ADJACENT SMALL ISLANDS. By J. F. M. CANNON and E. B. BANGERTER 365–372
NOTES ON THE DISTRIBUTION OF *Thlaspi alpestre* L. IN DERBYSHIRE. By DAVID W. SHIMWELL 373–376
THE FULLER'S TEASEL. By P. N. TOPHAM 377–381
Euphrasia stricta LEHM. IN GUERNSEY. By P. F. YEO 383–385
PLANT NOTES 387–393
PLANT RECORDS. Compiled by E. C. WALLACE 395–400
ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 401–494
OBITUARIES 495–496

REPORTS

REPORT OF THE COUNCIL FOR 1967 497–500
TEESDALE DEFENCE COMMITTEE 501
COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA: THIRTEENTH ANNUAL REPORT TO 31ST DECEMBER, 1967 502–503
NORTH-EAST REGIONAL MEETING, YORK, 1967 503
EXHIBITION MEETING, 1967 504–515
PERSONALIA AND NOTICES TO MEMBERS 517–520
INSTRUCTIONS TO CONTRIBUTORS 521–522

ADDITIONAL NOTES ON THE FLORA OF BEDFORDSHIRE. By J. G. DONY .. 523–535
NOTES ON THE FLORA AND VEGETATION OF FOULA, ZETLAND (V.C. 112). By D. L. HAWKSWORTH 537–547
VARIATION WITHIN *Centaurea nigra* L. By D. J. OCKENDON, S. M. WALTERS and T. P. WHIFFEN 549–552
NETWORK RESEARCH 553–559
PLANT NOTES 561–562
PLANT RECORDS. Compiled by E. C. WALLACE 563–566
ABSTRACTS FROM LITERATURE. Compiled by D. H. Kent 567–614
LOCAL FLORAS CURRENTLY AVAILABLE FOR SALE. Compiled by FRANKLYN PERRING 615–617
BOOK REVIEWS 619–622
OBITUARIES 623–625

REPORTS

WELSH REGION REPORT FOR 1967–1968 627
SOUTH-WEST REGIONAL MEETING, 1968 628
FIELD MEETINGS, 1968 629–639
PERSONALIA AND NOTICES TO MEMBERS 641–645

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Continued on inside of back cover

DISTRIBUTION, DATES OF ORIGIN AND ACREAGE OF *SPARTINA TOWNSENDII (s.l.)* MARSHES IN GREAT BRITAIN

J. C. E. HUBBARD and R. E. STEBBINGS

The Nature Conservancy, Furzebrook Research Station, Wareham, Dorset

INTRODUCTION

Spartina townsendii (*s.l.*) has spread to occupy large areas of intertidal mudflats around the shores of the British Isles during the past one hundred years. Although the grass is capable of covering suitable mudflats rapidly by a combination of seeding and vegetative growth, its initial introduction by man into new sites has hastened its rate of spread and widened its distribution.

The origin of *Spartina townsendii* (*s.l.*), its nomenclature and previous estimates of total acreage have been described by Hubbard (1965b).

A recent estimate of 30,000 acres (12,140 ha) of *Spartina townsendii* (*s.l.*) in the British Isles was prepared by Goodman, Braybrooks and Lambert (1959) using aerial photographs and personal records. The paper described the topography of the major *Spartina* marshlands in Great Britain and it included a distribution map of *Spartina* marshlands in the British Isles. The present estimate has been divided into acreages limited by topographical features. It is hoped that publication in this form will act as a basis for further study and improved estimates. The present estimate was confined to Great Britain due to the difficulty of obtaining precise information from Ireland. It was carried out as part of a world survey of *Spartina* resources (Ranwell, 1967).

METHOD OF ESTIMATION

Areas were estimated visually from a grid superimposed over panchromatic aerial photographs. The grid was divided into rectangles representing 2 acres at a scale of 6 inches to one mile. Areas were corrected by scaling an aerial photograph from each flight against distances obtained from the one inch Ordnance Survey Maps.

Subjective estimates from documentary evidence (see Hubbard 1965a) or competent observers are given where no more reliable data was available.

In certain cases the aerial photographic cover was found to be either incomplete, of poor quality or out-dated by rapid spread of the grass. It was difficult to estimate areas of *Spartina* where the grass was found to be mixed with other species or consisted of scattered tussocks or clumps.

RESULTS

It is estimated that there are 29,742 acres (12,044 ha) of *Spartina townsendii* (*s.l.*) in Great Britain. 8258 acres (3443 ha) occur along the south coast, where the

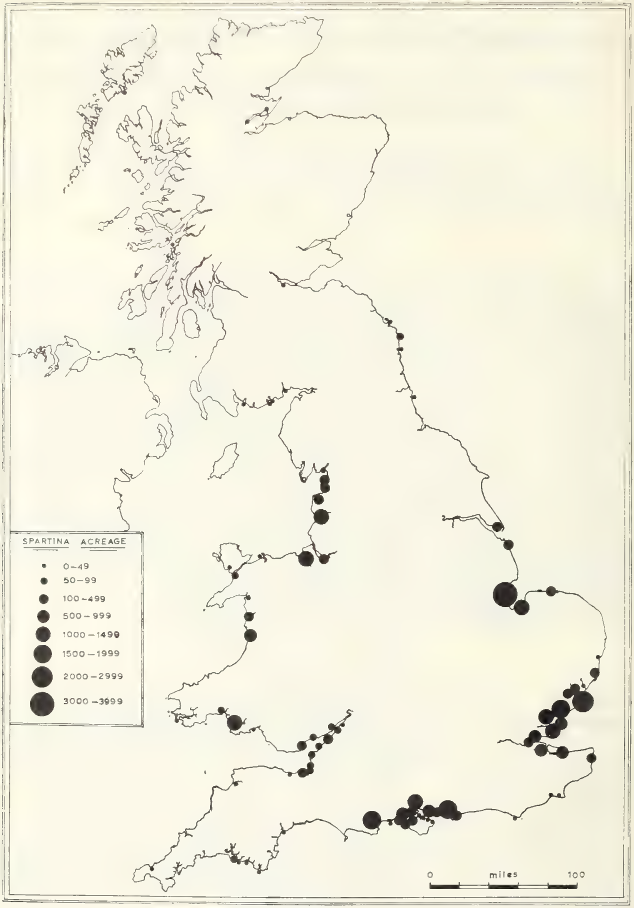

FIGURE 1. *Spartina townsendii (s.l.)* Marshes in Great Britain.

Spartina marshlands have mostly reached maturity and degeneration is widespread. There are 5716 acres (2313 ha) of *Spartina* along the west coast to a northern limit in the Isle of Harris. Approximately 80% of the acreage on the west coast is found within the Severn Estuary, Burry Inlet, River Dee, River Dovey and River Ribble. *Spartina* marshlands total 15,768 (6381 ha) along the east coast and reach a northern limit in the Cromarty Forth. Approximately 80% of the acreage on the east coast is restricted to the Wash and the Essex shoreline. (Figure 1.)

The name *Spartina townsendii* (*s.l.*) has been used throughout this paper to include *Spartina* × *townsendii* ($2n = 62$) and *Spartina* × ($2n = 120+$). (see Hubbard 1965b). *Spartina* × *townsendii* is only found in quantity below Hythe, in Southampton Water. Elsewhere it is limited to small patches within the marsh or as a narrow fringe near the landward limit of *Spartina* ×. There are probably not more than 50 acres (20 ha) of *Spartina* × *townsendii* in Great Britain at present. Acreage of *Spartina townsendii* (*s.l.*) arranged under localities, dates of of introduction to each locality and the source of the present estimate, are given in table 1.

TABLE 1. DISTRIBUTION, DATES OF ORIGIN AND AREAS OF *SPARTINA TOWNSENDII* (*s.l.*) MARSH IN GREAT BRITAIN

SOUTH COAST

LOCALITY	*DATE OF ORIGIN*		*ESTIMATE OF AREA*		
	Natural spread	*Planting*	*Acreage*	*Hectares*	*Date and Source*
CORNWALL					
Tamar, Tavy & Lynher Estuaries		1939	94	38	1948-51 (Pethick 1965)
DEVON					
Exe Estuary		1935	15	6	1960 (Aerial photographs)
Salcombe Estuary	1954		1	0·4	1958 (S. Bryce in litt.)
Erme Estuary			5	2	1956 (P. A. Caldwell in litt.)
Yealm Estuary	1955		1	0·4	1955 (P. A. Caldwell in litt.)
DORSET					
Poole Harbour	1890		1,717	694	1952 (Hubbard 1965b)
HAMPSHIRE					
Christchurch Harbour	1913		38	15	1959-63 (Aerial photographs)
Southampton Water	1870		1,180	477	1963 (Aerial photographs)
Beaulieu Estuary		1898	449	182	1963 (Aerial photographs)
Lymington Estuary	1893		871	351	1959 (Aerial photographs)
Keyhaven	1895		369	147	1959-62 (Aerial photographs)
Portsmouth Harbour	1900		651	263	1963 (Aerial photographs)
Langstone Harbour	1900		477	193	1965 (Aerial photographs)
HAMPSHIRE/SUSSEX					
Chichester Harbour	1896		1,779	715	1963 (Aerial photographs)

LOCALITY	*DATE OF ORIGIN*		*ESTIMATE OF AREA*		
	Natural spread	*Planting*	*Acreage*	*Hectares*	*Date and Source*
ISLE OF WIGHT					
Yar Estuary	1893		141	56	1962 (Aerial photographs)
Newtown Estuary	1893	1933	157	63	1962 (Aerial photographs)
Medina Estuary	1895		11	4	1962 (Aerial photographs)
King's Quay			8	3	1963 (Aerial photographs)
Wooton Creek			9	4	1962-63 (Aerial photographs)
Brading Harbour	1923	1928	20	8	1966 (Estimate)
SUSSEX					
Pagham Harbour	1919		248	100	1963 (Aerial photographs)
Cuckmere Estuary			5	2	1966 (Estimate)
Rother Estuary	1922	1942/47	5	2	1966 (F. N. Midmer in litt.)
KENT					
Dungeness		1930	1	0·4	1966 (Estimate)
EAST COAST					
KENT					
Pegwell Bay	1934		100	40	1966 (Estimate)
The Swale		1927	560	228	1953-63 (Aerial photographs)
Medway Estuary		1920/32/36	689	278	1950/55/61 (Aerial photographs)
Thames Estuary			261	108	1961 (Aerial photographs)
ESSEX					
Canvey Island		1926/27/29	739	298	1961 (Aerial photographs)
Crouch, Roach Estuaries & Mappin Sand		1927/29/33/63	1,311	530	1955 (Aerial photographs)
Dengie Marshes		1927	650	263	1955 (Aerial photographs + estimate to 1966)
Blackwater Estuary		1924-29	1,164	469	1946-63 (Aerial photographs)
Mersea Island		1927-41	838	335	1963 (Aerial photographs)
Colne Estuary		1924/31/37/50	767	316	1955-63 (Aerial photographs)
Brightlingsea			300	121	1963 (Aerial photographs)
Hamford Water		1927/29/33	2,289	1129	1956 (Aerial photographs)
SUFFOLK/ESSEX					
Stour Estuary		1923/27/29	370	149	1946-53 (Aerial photographs)
SUFFOLK					
Orwell Estuary			142	58	1946-63 (Aerial photographs)
Deben Estuary			5	2	(Estimate)
Ore & Alde Estuaries		1934	122	49	1953 (Aerial photographs)
Blyth Estuary			1	0·4	(Estimate)
NORFOLK					
North Norfolk Coast		1907/11/27/30/31	200	81	1966 (Estimate)
LINCOLNSHIRE/NORFOLK					
Wash (Norfolk)		1910/33/57	1,366	540	1966 (Aerial photographs 1958 + J. Morley in litt.)

LOCALITY	*DATE OF ORIGIN*		*ESTIMATE OF AREA*		
	Natural spread	*Planting*	*Acreage*	*Hectares*	*Date and Source*
Wash (Lincolnshire)		1927/30/36/44/56	3,400	1,374	1958 (Aerial photographs 1958 + J. Morley in litt.)
LINCOLNSHIRE					
Saltfleet			200	81	1962 (Aerial photographs)
YORKSHIRE/LINCOLNSHIRE					
Humber Estuary		1936/48/52/54	200	81	(Estimate)
NORTHUMBERLAND					
Aln Estuary		1930	1	0·4	(Estimate)
Budle Bay			85	34	1963 (Aerial photographs)
Fenham Flats		1929	5	2	(Estimate)
WEST LOTHIAN					
Firth of Forth		1914/18	1	0·4	(Estimate)
CROMARTY					
Cromarty Firth		1946	1	0·4	(Estimate)
		WEST COAST			
CORNWALL					
Hayle Estuary	1958		1	0·4	1966 (Estimate)
DEVON					
Torridge & Taw Estuaries		1934	30	12	1966 (Estimate)
SOMERSET					
Lilstock Harbour	1966		1	0·4	1966 (J. Morley in litt.)
Bridgwater Bay		1929	263	106	1963 (Aerial photographs)
Burnham			100	40	1966 (Estimate)
Berrow	1918		58	23	1942 (Boley 1942)
Sand Bay	1936		48	19	1963 (Aerial photographs)
Clevedon		1919	96	38	1963 (Aerial photographs)
GLOUCESTER					
Avonmouth	1930		157	63	1963 (Aerial photographs)
Aust	1935		73	29	1955 (F. W. Rowbotham in litt.)
Berkeley		1921/34	13	5	1955 (F. W. Rowbotham in litt.)
Beachley		1932/49	80	32	1955 (F. W. Rowbotham in litt.)
MONMOUTH					
Usk Estuary		1932	63	25	1962 (Aerial photographs)
GLAMORGAN					
Cardiff			127	51	1962 (Aerial photographs)
Swansea Bay			1	0·4	1965 (Estimate)
Burry Estuary		1931	1,000	405	1965 (Estimate)

LOCALITY	*DATE OF ORIGIN*		*ESTIMATE OF AREA*		
	Natural spread	*Planting*	*Acreage*	*Hectares*	*Date and Source*
CARMARTHEN					
Taf Estuary		1932	50	20	1966 (Estimate)
PEMBROKE					
Milford Haven			25	10	1952 (Aerial photographs)
CARDIGAN/MERIONETH					
Dovey Estuary		1920	(400-)600	(162-)243	1965 (E. H. Chater in litt.)
MERIONETH					
Mawddack Estuary		1929	264	108	1962 (Aerial photographs)
Traeth Bach			1	0·4	1966 (Estimate)
CAERNARVON					
Foryd Bay		1934	90	36	1966 (Estimate)
Conway Estuary		1946	1	0·4	1966 (Estimate)
ANGLESEY					
Malltraeth Bay			5	2	1965 (D. S. Ranwell in litt.)
FLINT/CHESHIRE					
Dee Estuary	(?)1945	1925	1,000	405	1966 (J. Morley in litt.)
CHESHIRE/LANCASHIRE					
Mersey Estuary		1929	100	40	1966 (J. Morley in litt.)
LANCASHIRE					
Ribble Estuary		1932	1,000	405	1966 (J. Morley in litt.)
Wyre Estuary	1942		250	101	1966 (J. Morley in litt.)
Keer Estuary			100	40	1966 (J. Morley in litt.)
Kent Estuary			10	4	1966 (J. Morley in litt.)
Lune Estuary			100	40	1966 (J. Morley in litt.)
KIRKCUDBRIGHT					
Gillfoot Bay	1958		1	0·4	1958 (H. Milne-Redhead in litt.)
Rough Firth		1951	1	0·4	1958 (H. Milne-Redhead in litt.)
Auchencairn Bay	1947		10	4	1956 (K. W. Braid in litt.)
Fleet Bay		1946	1	0·4	1960 (W. J. McCullock in litt.)
ARGYLL					
Firth of Lorne		1929/34	5	2	1959 (J. Bryce in litt.)
HEBRIDES					
Isle of Harris		1934/35	1	0·4	1954 (J. Rose in litt.)

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TRUE SERVICE TREES OF WORCESTERSHIRE

AUGUSTA PATON

The True Service Tree—*Sorbus domestica*—is a native of the continent of Europe and was not known to grow wild in this country, except for one single tree whose origin has been a matter of speculation for generations.

This ancient Sorb Tree (or Whitty Pear, to give it its local name) grew in Wyre Forest in Worcestershire and was first mentioned by Edmund Pitt, an Alderman of Worcester, in 1678. He wrote that he found this rarity growing wild in Wyre Forest and that no other writer or botanist of that time had ever mentioned it as a native tree. (See Jeffrey, 1918.)

The next specific reference appears in Cox's *Magna Britannia* of 1690, (Cox, 1720) when Pitt's discovery was referred to. Then when Nash published his *History of Worcestershire* in 1781 (Nash, 1781) he tells the story of the tree. He gives some excellent illustrations and writes: 'It has been a curiosity for upwards of 100 years.' The height was then 40 feet (12·2 m.).

Though some early botanists stated that the Sorb Tree grew in the mountainous parts of Cornwall and in Staffordshire, these were thought to be mistakes, as 'diligent search was made in these places for the tree by many botanists during the eighteenth century, but failed to reveal any other tree'. It therefore seems reasonable to assume that the Wyre Forest tree was the only specimen growing wild in Britain.

It seems unlikely that the tree was native as no other specimens were recorded in early days. That it was very old is certain. One theory for its introduction into the Wyre Forest was that the Romans brought it from the continent. This hardly seems likely, although a Roman villa was discovered about eight miles away.

An examination of the site made about a hundred years ago showed that in early times there had been a dwelling. Among debris some thin bricks and portions of a wall about a foot high were found, and a little to the west a mound of loosely consolidated stones, which were the remains of some structure. This gave rise to a second theory which was that the tree was brought from Aquitaine and planted by some hermit or recluse in the reign of Edward III, and that he made use of the fruit and leaves for disposal as charms against witchcraft.

The most likely theory however seems to be that the young tree was brought over and planted by a forest keeper when this country had connections with Anjou and Normandy. It is, however, certain that 'the existence of the tree was a most singular and interesting botanical fact'. (Jeffrey, 1918.)

The appearance of the Sorb tree (*Sorbus domestica*) is very similar to that of the Mountain Ash (*Sorbus aucuparia*), but the leaves are more downy beneath and the clusters of flowers are not so flat. The greatest difference concerns the fruit. This consists of small bunches of 'pears', green, but tinged with yellow on one side when they are ripe. The fruit is extremely harsh and astringent, but when it is kept until October it has the same pleasant acidity as a medlar (*Mespilus germanica*). The tree was cultivated in Anjou and in central and southern Europe for the sake of its wood, and also for its fruit, from which was made a kind of wine or perry. It was also preserved in a dried state like prunes. The wood was valuable as it is very hard and takes a high polish, and was much sought after by turners and cabinet makers. It was also used for mill machinery and mathematical instruments.

In old days the Rowan tree (*Sorbus aucuparia*) was deemed to have protective powers, and the Sorb tree (*Sorbus domestica*), being so like it, was supposed to be even more efficacious. The dried fruit used to be hung in the cottages as a protection from witches and even in 1867 the idea of its virtues had not entirely died away.

There are several English names of *Sorbus domestica*, e.g. the 'True Service', the 'Whitty Pear' and the 'Sorb' tree. The name 'Service' probably derives from the Latin *cervisia*, a beer made from malt, as from ancient times its fruit was used for making a kind of beer. In the west country the local names for the Mountain Ash (*Sorbus aucuparia*) were the 'Whitty', 'Wicken' or 'Quicken' tree and the 'Whitty Pear' simply means the Mountain Ash with pear-like fruit. 'Whitty' may be derived from the Anglo-Saxon *witan* meaning knowledge or wisdom and no doubt had some connection with the supposed virtues of the Rowan tree as a charm against witchcraft.

Another name for *Sorbus domestica* is 'Cheque' tree, possibly derived from 'choker', 'an allusion to the unpalatable fruit, fit to choke one'.

The final chapter in the history of the Wyre sorb tree is a sad one. This ancient tree, venerated by botanists from all over the country, had become a withered wreck by the middle of the nineteenth century, the top branches alone bearing flowers and fruit at their extremities. In 1858 a large party of naturalists exploring the forest gathered beneath it for lunch: four years later it was destroyed by fire. The miscreant of this dastardly deed was a notorious poacher. He had been sentenced by a local magistrate, Squire Childe of Kinlet, to what he considered too severe a term of imprisonment. In order to spite the squire, who was particularly fond of the sorb tree, he burnt it to the ground. Just retribution speedily followed. The poacher not long afterwards was convicted of setting fire to some farm buildings. He was transported and condemned to spend the rest of his days at Botany Bay.

All that was left of the old sorb tree was a blackened stump and various limbs. These were carefully collected by Mr George Jorden, a well known botanist of Bewdley. Out of these branches he had four goblets made. The most elaborate of them had silver bands round the rim and foot on which were engraved respectively the blossom and early leaves of the tree and the fruit and mature leaves. It was presented to Mr William Matthews, Honorary Secretary of the Severn Valley Field Club.

On the 30th June 1864 about eighty members of this club met at the site of the old tree, and around its blackened stump they sang a requiem lamenting the destruction of a tree so long an object of veneration. Unfortunately the words and music sung on this sad occasion have not been recorded.

Beside the goblets a bench was made from the sorb tree's wood which was presented to the Hastings Museum, Worcester Victoria Institute. There is now no record of this relic. Two boxes were also made by the foresters. An inscription on one reads, 'Box made by John Simmonds out of the old Witty Pear Tree, Wyre Forest'; on the other, 'This box was made of wood out of the old Witty Pear Tree (*Pyrus sorbus*), Alton Woods, Wyre Forest by Francis Bent and given to me in June 1912—John Slade Lea'. John Lea was the son of the Rev. Josiah Lea (1822-1899) who was an original member of the Worcestershire Naturalists' Club. John Lea died in 1962, aged 92. The two boxes have now been presented to the Folk Museum at Hartlebury Castle by his neice.

The Worcestershire Naturalists' Club was anxious to perpetuate the memory of the old tree, and Mr Robert Woodward of Arley Castle, a keen arboriculturist, who had managed to raise some young saplings promised one to be planted on the spot. In the meantime the Club met to erect a memorial post which bore the following inscription:

> 'On this spot stood for some centuries the only specimen in this country growing wild of the Sorb or Whitty Pear Tree (Pyrus domestica) which was burnt down by an incendiary in 1862. This post has been set up by the Worcestershire Naturalist's Club, 25th July 1911, to mark the site. The Right Rev the Lord Bishop of Worcester, F.S.A., President, F. T. Spackman, F.G.S., Honorary Secretary'.

On Thursday, March 30th 1916, the young sapling was planted in the presence of many members of the club. The ceremony was performed by Mrs Woodward. It was a solemn occasion as Mr Robert Woodward (Junr.), who had raised the young tree, had been killed in action. As it had been his intention to plant it in the forest, his mother was carrying out her son's wish.

The young tree grew and thrived. In 1920 it was well established. By 1925 the leading shoot was 20 feet (6·1 m) high. In 1935 it narrowly escaped the fate of its predecessor as a forest fire swept that part of the wood but fortunately passed a short distance away. By 1939 the young tree's girth 3 feet (90 cm) from soil level was 32½ inches (82·5 cm) and its height approximately 35 feet (10·7 m). Today this tree has a girth of 45 inches (1·1 m.) and is over 40 feet tall (12·2 m). It produces flowers and fruit, but not every year. At its base there is an inscription which reads:

> 'This sorb tree, a direct descendant of the original tree, was presented by Robert Woodward of Arley Castle and planted by Mrs Robert Woodward on the 30th of March 1916. John Humphries Esq., M.A., M.D.S., L.D.S., President—F. T. Spackman Esq., F.G.S., Hon. Secretary.'

Sorbus domestica in this country is very difficult to propagate. It is said not to bear flowers or fruit until it is about sixty years old. Between 1800 and 1820 Lord Montmorris of Arley Castle succeeded in raising two saplings from seed; these were planted in the Castle grounds and grew into fine specimens. The *Gardeners' Chronicle* of 1907 (see Woodward, 1907) contained an article on the Sorb Tree and told how these seedlings were planted at the beginning of the nineteenth century. In 1903 one tree measured 53 feet (16·2 m) in height and 7 feet 9 inches (2·4 m) in circumference at breast height. This magnificent specimen is now over 60 feet (18·3 m) tall and 12 feet (3·7 m) in girth. A younger tree, also grown from a 'pip', was planted in 1903. A year later it was 5 feet 3 inches (1·6 m) high and 6 feet (1·8 m) high by 1907. It too is now a fine mature specimen. A third tree growing in the Arley arboretum is not mentioned in the 1907 catalogue.

A tree grown from a 'pip' by the late Sir Chad Woodward about thirty years ago is growing in the grounds of Arley Cottage. It has already borne flowers and fruit which is contrary to Jeffrey's statement made in 1916 (Jeffrey, 1918) that it does not flower before it is sixty years old in this country.

There are other descendants of the Sorb tree propagated at Arley. One grew in the Precentory Garden at Worcester. In 1907 it was about 20 years old and was 13 feet (4·0 m) high and 13 inches (33·0 cm) in girth. This tree had to be removed a few years ago, but has been replaced by one near the Chapter House. This must now be about 8 or 10 years old and is well established, but there are no signs of another tree which was growing before the war in the Mount Royal Gardens in Worcester.

Two trees grow in the Botanic Gardens at Oxford. The guide to the Gardens of 1912 says: 'One tree over fifty feet high is said to have been planted around 1790 from fruit gathered in Wyre Forest.' Whereas the fruit of this tree is like a small pear, the fruit of the other tree is more like an apple and they are known as the Whitty apple and the Whitty pear trees.'

Two more trees, which are almost certainly descendants from Arley, were recorded in 1905 by H. J. Elwes in *The Trees of Great Britain and Ireland* (Elwes and Henry, 1906). He writes: 'At Croome Court, Worcestershire, the seat of the Earl of Coventry, there are two good sized trees in the shrubbery, one of which is 59 feet high and 6 feet 2 inches in girth. The other with a clean stem, about 50 feet by 7 feet is beginning to decay. Lady Coventry told me that the fruit, which is only produced in good seasons, makes excellent jam when fully ripe, but some seeds which she was good enough to give me did not germinate.'

Another tree was said to grow locally at a farm on the Croome estate, but though the farmer and the writer searched all through a copse for it, all we found was a beautiful Wild Service Tree—*Sorbus torminalis*. This lovely shrub or small tree is fairly common in south Worcestershire.

'The only specimen in this country growing wild' . . . so runs the notice on the post marking the site of the old Sorb tree in the Wyre Forest. But this is not so. From a wood in south Worcestershire another of these interesting trees has lately been reported. It is growing, apparently quite wild, in a little thicket near the edge of the wood. Round it the plants are typical of a rather calcareous soil: ash (*Fraxinus excelsior*), maple (*Acer campestre*), dogwood (*Swida* (*Thelycrania*) *sanguinea*), guelder rose (*Viburnum opulus*) and privet (*Ligustrum vulgare*), and not far away grow oaks (*Quercus petraea*), spindle (*Euonymus europaeus*), butterfly orchids (*Platanthera chlorantha*), houndstongue (*Cynoglossum officinale*), dropwort (*Filipendula vulgaris*) and four different kinds of wild roses. It is a spot beloved of birds, and nightingales sing there in the spring. Man has obviously not been responsible for planting this part of the wood, so the supposition must be that the Sorb tree is bird sown. Perhaps the seed was from one of the trees at Croome Court before decay set in, or from the farm mentioned previously; neither is far away. But whatever its origin there this tree grows, a beautiful specimen producing flowers and fruit in due season. It is a little under 40 feet (12·2 m) in height and its girth at 3½ feet (1·1 m) from the ground below a large branch is 50 inches (1·3 m), but it is by no means fully grown yet. Although *Sorbus domestica* has not been proved conclusively to be indigenous as far north as Britain, the south Worcestershire tree would seem to be quite as wild as its famous predecessor in the Wyre Forest.

Long may it flourish in its peaceful sylvan setting, undisturbed by vandals or incendiaries.

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A KEY TO THE IDENTIFICATION OF THE MALE FLOWERS OF BRITISH DIOECIOUS SPECIES

R. TINKLIN

The problem of dioecious species is often encountered by students whose experience is insufficient to enable them to place a plant in its family with confidence. The artificial key to identification provided in the *Flora of the British Isles* (Clapham, Tutin and Warburg, 1962) can usually be employed successfully with female plants but ignorance of the ovary characters renders the identification of male plants impossible except by repeated trial and error. In an attempt to rectify this difficulty a simple key to male dioecious plants has been constructed which it is intended should be introduced as an additional alternative at number 13 in the key to families.

1	Aquatic plants or plants rooted in permanently waterlogged soil	2
	Land plants	5
2	Shrubs or trees	3
	Herbs	4
3	Shrub strongly aromatic when bruised; bogs and fens	*Myrica gale*
	Not aromatic	*SALICACEAE*
4	Leaves with many large spinous teeth (Hickling Broad)	*Najas marina*
	Leaves not as above	*HYDROCHARITACEAE*
5	Hemiparasite; somewhat woody evergreen on branches of trees; leaves yellowish-green, rather tough and leathery	*Viscum album*
	Free-living plants	6
6	Trees or shrubs	7
	Herbs, or if shrubby then small, prostrate with dense leaves oblong, 4-6 mm long	13
7	Leaves reduced to small scarious scales; bearing broad dark green flattened leaf-like cladodes	*Ruscus aculeatus*
	Plant with photosynthetic leaves	8
8	Plant armed with thorns or spiny leaves	9
	Plant unarmed	11

9 Plant with dark shiny leaves with spines at margins *Ilex aquifolium*
Plant with thorns 10

10 Leaves stipulate, petioled *Rhamnus catharticus*
Leaves exstipulate, sessile or subsessile *Hippophaë rhamnoides*

11 Flowers in catkins *SALICACEAE*
Flowers in erect racemes or axillary panicles 12

12 Flowers in erect racemes, yellow-green, 4-6 mm diameter *Ribes alpinum*
Flowers in axillary panicles appearing before leaves, purplish *Fraxinus excelsior*

13 Climbers or twiners 14
Non-climbers 16

14 Leaves palmately lobed 15
Leaves broadly ovate, deeply cordate at base; flowers in axillary racemes; no tendrils *Tamus communis*

15 Plant with tendrils; flowers in axillary corymbs, 12-18 mm diameter *Bryonia cretica* L. (*B.dioica* Jacq.)
Plant without tendrils; flowers about 5 mm diameter in axillary or terminal panicles *Humulus lupulus*

16 Flowers in umbels or involucrate heads 17
Flowers not as above 21

17 Flowers in umbels; leaves tripinnate with filiform segments (S.W. England) *Trinia glauca*
Flowers in involucrate heads (Compositae) 18

18 Leaves woolly 19
Leaves hairless or only moderately pubescent 20

19 Leaves 1-4 cm long mainly in rosettes; creeping stolons; plant 5-20 cm tall *Antennaria dioica*
Flowering stems erect, 30-100 cm tall; leaves 6-10 cm long *Anaphalis margaritacea*

20 Rhizomatous with large radical leaves 10-50 cm wide, cordate at base *Petasites* spp.
Leaves less than 10 cm wide, more or less ovate lanceolate, not cordate, margins with fine bristle-like teeth; receptacles flat with dense chaffy scales *Serratula tinctoria*

21 Flowers green to yellow 22
Flowers coloured or white (sometimes dingy white) 25

22 Leaves with stinging hairs *Urtica dioica*
Leaves without stinging hairs 23

23 Inflorescence terminal; flowers tetramerous; stock very thick and fleshy *Rhodiola rosea* L. (*Sedum rosea* (L.) Scop.)
Flowers in clusters or whorls 24

24 Flowers in clusters on pedunculate axillary spikes; perianth segments 3; stamens 8-15 *Mercurialis* spp.
Flowers in whorls on simple or branched inflorescence; perianth segments 3 + 3; stamens 6 *Rumex* spp.

25 Leaves scarious, small and triangular; cladodes needle-like; flowers dingy white *Asparagus officinalis*
Leaves photosynthetic 26

26 Flowers polypetalous 27
Flowers gamopetalous 28

27 Flowers red (rarely white), scentless, in many-flowered terminal clusters *Silene dioica*
Flowers white, slightly scented, in few-flowered terminal clusters *Silene alba*

28 Prostrate woody plant; flowers 1-3, axillary, 1-2 mm diameter, globular; leaves dense 4-6 mm long, dark green, oblong *Empetrum nigrum*
Nonwoody stoloniferous plant, erect; flowers 5 mm diameter; leaves 2-3 cm long elliptic to ovate; stem leaves sessile, pinnatifid *Valeriana dioica*

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THREE SPECIES OF *SIGESBECKIA* IN BRITAIN

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Plants of the genus *Sigesbeckia* (not *Siegesbeckia*) found occurring as aliens in Britain have been generally identified with *S. orientalis* L. A recent account of the genus in Europe published in Germany (H. Henker, 1965) has pointed out that there are in fact three different species occurring in Europe, all known from Britain. The commoner and perhaps only well established species in Britain is *S. cordifolia* H., B. & K. *S. orientalis* and *S. microcephala* DC. appear to occur only casually, particularly as wool adventives. The three species may be distiguished as follows:

1 Leaves narrowly elliptic or lanceolate with rather few irregular teeth, ± sessile, up to 2cm broad excluding the teeth; involucral bracts not conspicuous, not exceeding the flowers and fruits *S. microcephala* DC.
Leaves triangular-hastate to ovate or cordate, strongly constricted below the broadest point to form a variously winged 'petiole', the larger leaves 2-14 cm broad; outer involucral bracts conspicuous, spathulate, 1½-5 times as long as the flowers and fruits 2

2 Leaves broadly ovate to cordate, shallowly and regularly crenate or serrate, the petiole broadly winged to the base and ± amplexicaul *S. cordifolia* H., B. & K.
Leaves ± triangular-hastate, irregularly dentate or lobed, the petiole tapering from above and ± unwinged in the lower part, not amplexicaul *S. orientalis* L.

S. orientalis is widespread in Asia, Africa and Australasia, a variable species in which subspecies have been recognised. *S. cordifolia* is a native of Central and South America, and *S. microcephala* is a native of Australia.

The specimens from the British Isles in the herbaria of the British Museum, Natural History (BM), Royal Botanic Gardens, Kew (K), University of Liverpool (LIVU) and the private herbarium of Mr J. E. Lousley (herb. LOUSLEY) are cited below:

S. CORDIFOLIA H. B. & K.

V.-c. 12. NORTH HANTS:
Fir plantation near FLEET, probably introduced with poultry food, ix. 1935, G. WATTS (herb. LOUSLEY).
FLEET, on a refuse dump, 17. x. 1958, Miss V. LEATHER (herb. LOUSLEY).
FLEET, rubbish tip, 30. ix. 1958, Mrs BERENS & Miss V. LEATHER 2184 (K).
FLEET tip, 4. ix. 1960, Miss MCCALLUM WEBSTER 5034 (K).

V.-c. 16. West Kent:
On a cultivated strip at Fairseat Nursery, near Sevenoaks, 1960, G. St. Clair Fielden (K).

V.-c. 59. South Lancaster:*
Freshfield, vii. 1928, F. W. Holder (K).
Against the railway fence near Freshfield Station, 25. viii. 1928, F. W. Holder, R. Wagstaffe, J. N. Frankland & A. G. Langdon (herb. Lousley).
Freshfield, without date, F. W. Holder & Wagstaffe (K).
Lancs., viii. 1928, G. C. Druce H.1419 1928 (K).
Near Freshfield Station, 1. viii. 1937, J. E. Lousley (herb. Lousley).
Freshfield, waste ground, vii. 1940, J. A. Whellan (K).
Rufford, x. 1940, E. Hardy (BM).
Freshfield, roadside, x. 1941, G. V. C. Last (K).
A weed in the garden of Mrs H. Leggatt, 'The Elms', Formby, x. 1946 (K).
Freshfield, 3. ix. 1947, E. P. A. Jones (BM).
Garden, Freshfield, x. 1948, Miss W. Frost (herb. Lousley).
Formby, reported to be a persistent weed in back garden of 79 Duke Street, 30. viii. 1957, R. K. Brummitt 57.44 (LIVU).—duplicate at Vienna (W) cited by Henker (1965).
Freshfield, refuse tip, 17. x. 1964, Miss V. Gordon (herb. Lousley).
Formby refuse tip, near Southport, 11. x. 1966, Mrs E. Hodgson (herb. Lousley).

V.-c. 63/64. South-west/Mid-west Yorkshire:
Leeds, waste ground, x. 1933, W. A. Sledge H.2413 1933 (K).—poor specimen, identity perhaps doubtful.

S. ORIENTALIS L.

V.-c. 11. South Hants:
Bournemouth, rubbish tip, 25. x. 1954, Miss K. M. Marks (BM).

V.-c. 12. North Hants:
Blackmoor, 11. x. 1959, J. E. Lousley, W.1300 (herb. Lousley).
Blackmoor, 11. x. 1965, Lady Anne Brewis in herb. Lousley W 2648 (herb. Lousley).

V.-c. 15. East Kent:
Ash, 16. x. 1960, J. E. Lousley W 1620 (herb. Lousley).

V.-c. 17/21 Surrey/Middlesex:
Kew Bridge, vii, before 1873, Irvine (K).

V.-c. 30. Bedford:
Maulden, in beet near "Dog and Badger", 7. x. 1956, J. E. Lousley W 400 (herb. Lousley).
Maulden, arable weed, 24. ix. 1966, J. E. Lousley W 3032 (herb. Lousley).

V.-c. 37. Worcester:
Charlton, wool alien, ref. 53101121, 11. x. 1953, Miss C. M. Goodman (herb. Lousley).
Charlton, 15. ix. 1957, C. W. Bannister in herb. Lousley W 434 (BM).
Charlton, carrot field treated with wool shoddy, 25. x. 1958, Miss McCallum Webster 2209 (K) and 2252 (K).
Charlton, wool adventive, 2. x. 1960, J. E. Lousley W 1555 (BM).
Charlton, in parsnip, 29. ix. 1963, J. E. Lousley W 2042 (herb. Lousley).

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*Several specimens gathered at Freshfield are also to be found in the herbarium of the City of Liverpool Museums (LIV). They were collected at intervals between 1928 and 1963. **Ed.**

S. MICROCEPHALA DC.

V.-c. 30. BEDFORD:

MAULDEN, arable field, introduced with wool shoddy, 2. x. 1962, Miss McCALLUM WEBSTER 8199 (K).

MAULDEN, wool adventive, 13. x. 1962, J. E. LOUSLEY W 2011 (BM; K; herb. LOUSLEY).

The earliest of the above specimens to have been collected is that of *S. orientalis* from Kew Bridge. The specimen has no date, but the collector is Irvine, presumably Alexander Irvine who lived from 1793 to 1873 and was editor of *The Phytologist* from 1855 to 1863. It seems likely that the specimen was collected in the period 1850-1865.

S. cordifolia seems to have been first collected in 1928 in South Lancashire, and was recorded as *S. orientalis* in *Rep. botl. Soc. Exch. Club Br. Isl.*, **8** (5), 617-618 (1929). It has been collected at regular intervals in the same district since then and is said to be a persistent weed. It has probably persisted also at Fleet in North Hampshire from at least 1935, and was recorded from there as *S. orientalis* in *Rep. botl. Soc. Exch. Club Br. Isl.*, **11** (1), 31 (1936). The further record given there from Selby, Yorkshire, may well also be referable to *S. cordifolia*, but specimens have not been traced. The only record traced of *S. cordifolia* under the correct name is that from Oxford by J. P. M. Brenan in *Rep. botl. Soc. Exch. Club. Br. Isl.*, **12** (3), 282 (1942).

Thanks are due to Mr J. E. Lousley for the loan of specimens from his herbarium and for his helpful comments.

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SUPPLEMENT TO A GUIDE FOR LOCAL FLORA WRITERS

Compiled by FRANKLYN PERRING

The Guide for Local Flora Writers was published in October 1964 (Perring, 1964). It contained, as an Appendix, a list of recent Local Floras, Supplements and work in progress. Since then the continued interest in Local Flora writing has seen the publication of several new Floras, and new work has begun which promises many more. As the purpose of the list was to keep members informed of what was going on, to give them opportunities to help with projects already underway or to stimulate them to begin in areas where nothing was being done, it has been agreed that this new up-to-date list should be published now. It is hoped to follow it in two years time with a completely new edition of the Guide.

1a Isles of Scilly. It is hoped that the manuscript prepared by J. E. Lousley will go to press during 1968. A check-list will be published in Scilly during 1967.

15 E. Kent. The Botanical Section of the *Thanet Natural History Society* is preparing a Flora of the Isle of Thanet on a 1 km square basis.

17 Surrey. A new Flora should be published in 1968 or 1969.

16, 17, 18, 19, 20, 21, 24. London Area. The Botanical Section of the *London Natural History Society* has begun to collect distribution data on a 2 × 2 km square basis.

20 Herts. A new Flora by J. G. Dony was published in May 1967. It contains one hundred and twelve pages with thirty-one plates and fifty-six pages of maps, and can be obtained from the Curator, Hitchin Museum and Art Gallery, Paynes Park, Hitchin, Hertfordshire, price two guineas.

21 Middlesex. The manuscript of the Flora, prepared by D. H. Kent, may go to press in 1967. It is hoped that it will be available before the end of 1968.

22 Berkshire. By January 1967 over half of the new Flora by H. J. M. Bowen had been written. It should be published in 1968.

24 Bucks. P. R. Knipe has begun collecting data for a new Flora on a 2 × 2 km square basis. He is being assisted by E. R. B. Little, who has prepared a Bryophyte Flora of the county.

31 Hunts. A '*Flora*' by J. L. Gilbert was published in 1965. It is really little more than a check-list, with localities for only the rarest species. It can be obtained from Peterborough Museum, price 7s. 6d., post free.

32 Northampton. Mrs A. M. Gent and the *Kettering Natural History Society* are continuing the work started by G. F. Laundon, who is now abroad, to collect data for a new Flora or Supplement.

36 Hereford. Mrs L. E. Whitehead hopes to publish a new Flora by 1969.

37 Worcester. F. Fincher is collecting information for a new check-list.

38 Warwick. A check-list, with first records, and information on presence or absence in neighbouring counties, was published in 1965, and may be obtained from the *Birmingham Natural History Society*, The Midland

	Institute, Birmingham, 1, price 15s. 0d., post free. It is hoped that the full new Flora will be available within the next twelve months.
42	Brecon. The First Flora of Breconshire in *The Breconshire Border*, ed. T. R. Phillips, 1926, Talgarth.
44	Carmarthen. The manuscript being prepared by R. F. May and I. M. Vaughan is almost complete. It will be published by the *West Wales Naturalists' Trust* with the aid of a grant from the County Education Authority.
42, 43, 46, 47.	Central Wales. A group under the direction of J. P. Savidge, the Botany Department, University College, Aberystwyth, is preparing a 'Flora of Central Wales', which will include the whole of Radnor, Cardigan and Montgomery, and at least the northern part of Breconshire.
49, 52	Caernarvon and Anglesey. Work on the new Flora is now being co-ordinated by A. J. E. Smith.
50	Denbigh. Carter, P. W., 1960. Some account of the Botanical Exploration of Denbighshire. *Trans. Denb. Hist. Soc.*, **9**, 114-45. There is also a manuscript *Flora of Denbighshire* by A. A. Dallman in five volumes at the City of Liverpool Museums.
51	Flint. There is a manuscript *Flora of Flint* by A. A. Dallman in five volumes at the City of Liverpool Museums. It contains records made after 1911, the date of the last of Dallman's publications on Flint in the *Journal of Botany*.
55	Rutland. J. Chandler and G. Messenger are preparing their Flora on a 2 × 2 km square basis. It will be published by Leicester City Museum.
58	Chester. Work on a new Flora is being co-ordinated by A. Newton. The 5 × 5 km square has been adopted as the unit of recording.
66	Durham. Work on a new Flora is now being co-ordinated by G. G. Graham.
78	Peebles. D. J. McCosh has begun to collect together data for a new Flora.
82-84	Lothians. Copies of *Field Club Flora*, I. H. Martin, 1927, are available from W. Hall, 'Elmore', Broxburn, W. Lothian, price 11s. 3d., post free.
86	Stirling. Stirling, J. S. & Kidston, R. A series of notes on the flora of Stirlingshire appeared from 1890 onwards in the *Trans. Stirling Nat. Hist. archaeol. Soc.*
87-89	Perth with Clackmannan. Barclay, W., 1912. Additions to the list of Perthshire Plants. *Trans. Proc. Perthsh. Soc. nat. Sci.* **5**, Matthews, J. R. 1927. Recent additions to the list of Perthshire Plants. *Trans. Proc. Perthsh. Soc. nat. Sci.* **8.**
103	Mid Ebudes. A group from the Natural History Museum (B.M.) in collaboration with Miss U. K. Duncan is collecting data for Mull on a 5 × 5 km square basis, and hopes to publish a Flora in due course.
104	N. Ebudes. Eggeling, W. J., 1965. Check List of the plants of Rhum. *Trans. Proc. bot. Soc. Edinb.*, **40**, 20-99. Mrs C. W. Murray is collecting data for a Flora of Skye on a 5 × 5 km square basis, in collaboration with R. Sworder.
H.1-2	Kerry. B. Goggin and M. Long are collecting data for a supplement.
H.10	N. Tipperary. R. McMullen is collecting data for a Flora on a 10 km square basis.
H.15-17, 26-27.	Galway and Mayo. Hart, H. C., 1883. Report on the Flora of the Mountains of Mayo and Galway. *Proc. R. Ir. Acad.*, **2**, *Sci.* III, 694-768.

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PLANT NOTES

325/h. RUMEX HIBERNICUS Rech. f. This taxon, described by Rechinger in *Watsonia*, **5**, 64-66 (1961), was based on material collected by Miss M. Scannell from sand dunes at Annagh Bay, Mullet Peninsula, West Mayo, v.c. H27. On July 16, 1965 in the company of D. McClintock I collected material from the sides of dunes near Annagh Head which agreed closely with the original description and with specimens in Herb. Kew (K) cited by Rechinger. Three small shoots in fruit with roots attached were planted five days later in garden soil at Streatham, London and kept under observation. These shoots carried small fleshy cauline leaves up to 5 mm wide and had withered remains of lower leaves not exceeding 7 mm in width. In this, the straggling habit, and flexuous stems, they closely resembled the plants from Barra illustrated on Plate 5 of Rechinger's paper.

By September 4, 1965 all three plants had produced dense rosettes of thin radical leaves with lamina 30-35 × 20-25 mm, subobtuse with acute spreading basal lobes. By the following June, all three plants had produced fruiting shoots with four or five cauline leaves 5-6 × *c*.2 cm, and only the uppermost acute. The only unchanged feature of the original plants was that the fruiting sepals remained rather small, measuring *c*.3 × 4 mm. By September 1965 the three plants had produced dense clumps of thin luxuriant radical leaves with laminae measuring *c*. 11 × 5 cm. with flat margins, and with pedicels *c*. 11 cm. long. These were indistinguishable from common meadow forms of *R. acetosa* in southern England. Specimens have been deposited in the Herbarium of the British Museum (Natural History) (BM).

About 25 years ago I had a large number of variants of *R. acetosa* in cultivation and few of them retained the characters for which they were selected, but in no instance was the change as rapid as that of the Annagh plants in the first six weeks. They were grown in three different places in my garden giving slightly different conditions of drainage and exposure. Mr McClintock tells me that plants he took at the same time grown in his very loose sandy soil at Platt near Sevenoaks, Kent have changed relatively little. It therefore seems that this phenotype of *R. acetosa* is related to soil rather than climatic conditions.—J. E. LOUSLEY.

325/p. **Rumex pseudonatronatus** (Borb.) Murb. 1899, *Bot. Notiser*, **1899**, 16; *R. pseudonatronatus* Borb. subsp. *fennicus* Murb. 1899, *Bot. Notiser*. **1899**, 17; *R. fennicus* (Murb.) Murb. 1913, *Bot. Notiser*, **1913**, 228-233; *R. domesticus* Hartm. var. *pseudonatronatus* Borb. 1881, '*Békésmegye flórája*, **11**, 63'.; *R. crispus* L. var. *nudicaulis* Meisn. 1856 in DC., *Prodr*., **14**, 45.

Icones: Beck in Reichb. *Ic*., **24**, 21, t. 162 fig. 1-5, 1904.

A perennial with erect stem 50-150 cm tall, unbranched and often suffused with purple. Cauline leaves linear-lanceolate, crisped, 8-15 times as long as broad (15-30 cm long × 1-2·6 cm broad), narrowed at both ends. Inflorescence dense, thyrsoid, interrupted below. Fruiting perianth segments 3·5-5 mm long × 3·2-4·8 mm broad, subcordate at the base, entire, obtuse, all without tubercles.

Distribution: From Hungary north through European Russia to East Sweden, Finland and Siberia. Introduced in Holland and England. V.-c. 21, Middlesex; Hackney Marshes, Oct. 3, 1910, Herb. J. E. Cooper, det. Rechinger as *R. fennicus* Murb., Hb. Mus. Brit (BM). V.-c. 58, Chester. About 20 plants on quarry spoil on carboniferous millstone grit, Billinge Hill, Nat. Grid. SJ/33/9577, July 1965, P. Newton, and Sept. 22, 1966, Alan Newton, Hb. Lousley & Hb. Mus. Brit (BM).

R. pseudonatronatus is usually readily distinguished by its very narrow leaves from all other European docks lacking tubercles. Characteristically these leaves are less than 15 mm broad as shown in the specimen from Hackney Marshes. The immature material first received from Billinge Hill arrived withered but the leaves appeared to be up to 4 cm broad, which is considerably in excess of the width in any of the few specimens from abroad in British herbaria, and in published descriptions. The stem of the British plant is also stouter. Good fruiting material was received in September 1966 and a small piece of this was sent to Professor K. H. Rechinger for confirmation, and he replied:-

> 'The specimen of *Rumex* enclosed in your letter is beyond any doubt *R. pseudonatronatus* (Borb.) Murb. Leaf shape is more variable in this species than authors including myself have assumed originally. There are no transitions between *R. pseudonatronatus* neither with its closest relative *R. longifolius* DC. (= *R. domesticus* Hartm.) nor with *R. crispus* L. More or less sterile hybrids with both species are known but these occur rather rarely'.

As pointed out by Prof Rechinger, the species is most closely allied to *R. longifolius*, which it resembles in the absence of tubercles and dense panicles. In practice, the much larger perianth segments, and much broader flat leaves of *R. longifolius* make it unlikely that the two will be confused. Similarly there should be no difficulty in distinguishing *R. pseudonatronatus* from *R. aquaticus* L., since, although this is also without tubercles on the fruiting perianth segments, these are larger and more pointed, and the leaves much broader and triangular in shape. From forms of *R. crispus* without tubercles, *R. pseudonatronatus* may be distinguished by the dense thyrsoid panicles, uniformly smaller perianth segments, and the narrower leaves.

From the distribution it seems that *R. pseudonatronatus* is unlikely to be native in Britain. At Hackney Marshes, a famous hunting ground for aliens, it was certainly adventive. In the quarry at Billinge Hill, Cheshire, at an altitude of 950′, it may be that this boreal species has found suitable conditions for persistence.

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—J. E. Lousley

379/2. Vinca major subsp. hirsuta (Boiss.) Stearn. In a plant note in October 1964, (*Proc. bot. Soc. Br. Isl.*, **5**, 341) mention was made of a record of *V. herbacea* by Miss P. Stockdale from East Grinstead (recorded in the *Rep. botl. Soc. Exch. Club. Br. Isl.* for 1914, **4**, 17), and it was stated that no specimen had been seen in support of this.

In January I was at the South London Botanical Institute, where Mr J. E. Lousley had kindly turned up for me two sheets collected by Miss Stockdale, one labelled *V. herbacea* L. and the other *V. hederacea* L., both collected 4. v. 13. at East Grinstead. No doubt these are the specimens in question, but he and I agree that they are normal *V. minor*.—D. McClintock.

PLANT RECORDS

Compiled by E. C. WALLACE

'Plant Records' are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1966.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.V.B.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings*. Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora*, but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

1/2. LYCOPODIELLA INUNDATA (L). Holub (*Lycopodium inundatum* L.) 45, Pemb.; North Pembrokeshire, 1956, Mrs M. Barnes; scattered over several acres of moorland there, 1965, J. W. DONOVAN & T. A. W. DAVIS (1966, *Nature in Wales*, **10**, 41).

4/1. EQUISETUM HYEMALE L. 97, Westerness; stony calcareous flush, Coire Easain, Glen Spean, 1966, A. McG. STIRLING & D. A. WALKINSHAW.

§ 4/7. EQUISETUM SYLVATICUM L. ‡23, Oxon.; still on north side of Shotover, where it was last recorded by Wm. Baxter in 1825-6; considered by G. C. Druce to be extinct here and in the county, and omitted from *Comital Flora*, R. C. PALMER.

4/9 × 5. EQUISETUM × LITORALE Kühlew. ex Rupr. *112, Zetland; common in and around a boggy pasture at Gulberwick, south of Lerwick; damp roadside, North Califf, Tingwall parish; by main road, Cunningsburgh; streamside west of Housabister, North Nesting, R. C. PALMER, all conf. P. TAYLOR: probably widespread in Shetland, R. C. PALMER.

15/6. ASPLENIUM VIRIDE Huds. 104, N. Ebudes; The Storr, Isle of Skye, M. EDMUNDS. 'Given in Raven, J. & Walters, S. M., *Mountain Flowers*, but not included in the *Atlas of the British Flora*, E. C. WALLACE.

19/3. CYSTOPTERIS MONTANA (Lam.) Desv. 88, Mid Perth; limestone pavement near Lochan-an-Daim, Rannoch, A. W. PUNTER.

§ 21/a. DRYOPTERIS ASSIMILIS S. Walker. *97, Westerness; among quartzite block scree at 3,000 ft., Coire Easain, Glen Spean, A. McG. STIRLING & D. A. WALKINSHAW, conf. A. C. JERMY: *98, Argyll; Lochgoilhead area, Ben Donich: *99, Dunbarton; Ben Vane, south west, and summit: *108, W. Sutherland; Ben Hope, streamside coming down from summit plateau, A. G. KENNETH, all det. A. C. JERMY.

§ 24/4. Thelypteris dryopteris (L.) Slosson. *†25, E. Suffolk; St. Mary-le-Tower Church, Ipswich, several colonies, 1965, A. W. Punter.

§ 24/5. Thelypteris robertiana (Hoffm.) Slosson. *†25, E. Suffolk; broken tomb in St. Lawrence Churchyard, Ipswich, one colony: 88, Mid Perth; limestone pavement, Rannoch, A. W. Punter.

§ 25/a Polypodium australe Fée. ‡48, Mer.; in an inaccessible place on basic volcanic rock near Llan Ffestiniog, 1965, W. E. Hughes, conf. R. H. Roberts (1967, *Nature in Wales*, **10**, 87).

§†27/1. Azolla filiculoides Lam. *34, W. Glos.; derelict water garden, Westbury Court, Westbury on Severn, D. E. de Vesian.

§ 29/1. Ophioglossum vulgatum L. *104, N. Ebudes; among limestone rocks, Allt nan Leac, Torrin, Skye, c.s.s.f. field meeting, comm. A. McG. Stirling (as subsp. *vulgatum*).

34/1. Juniperus communis L. 104, N. Ebudes; on boulders below The Needle, Quarraing, Skye, M. Edmunds.

35/1. Taxus baccata L. 98, Argyll; limestone cliffs, Isle of Bernera, Lismore, A. A. Slack & A. McG. Stirling.

40/1 (1). Aconitum anglicum Stapf. †45, Pemb.; on the bank of the Eastern Cleddau River near Llanycefn, 1965, J. E. Taylor (1966, *Nature in Wales*, **10**, 42); in a copse, site of a ruined cottage last occupied in 1880, St. Ishmaels, T. A. W. Davis.

46/10. Ranunculus auricomus L. 98, Argyll; Pass of Melfort, rocky woodland, not common. A handsome form with perfect flowers, A. G. Kenneth.

§ 49/1. Aquilegia vulgaris L. *†96b, Nairn; two plants on shingle by the river Nairn, Kilravock, M. McC. Webster.

§ 66/4. Fumaria bastardii Bor. *19, N. Essex; a small patch in a railway siding near a banana warehouse, Little Canfield, J. R. Ironside Wood, det. P. D. Sell (as var. *bastardii*).

94/2. Draba norvegica Gunn. 97, Westerness; north facing rocks, limestone outcrop, Geal Charn, *c.* 3,400 ft., H. Milne-redhead.

118/1. Helianthemum nummularium L. (*H. chamaecistus* Mill.). 98, Argyll; limestone cliffs, Isle of Bernera, Lismore A. A. Slack & A. McG. Stirling.

137/1. Minuartia verna (L.) Hiern. 86, Stirling; rediscovered in the Ben Lomond area, after a lapse of ninety years; on basic schist, *c.* 2,000 ft., E. T. Idle & J. Mitchell.

§ 143/3. Spergularia rupicola Lebel ex Le Jolis. *6, N. Som.; Anchor Head, Weston-super-Mare, numerous plants, but only on lawn, and not on other uninhabited headlands so perhaps an introduction, 1963, R. M. Burton. 101, Kintyre; Island of Cara, south end, A. G. Kenneth.

149/1b. Montia fontana L. subsp. chondrosperma (Fenzl) Walters. 101, Kintyre; Knapdale, limestone, Keills; Danna, near Danna-na-Cloich, A. G. Kenneth, det. S. M. Walters.

†149/3. Montia sibirica (L.) Howell. 104, N. Ebudes, in ditch in lane above Dunvegan Castle, Skye, M. Edmunds.

168/10. Geranium columbinum L. 98, Argyll; limestone cliffs, Isle of Bernera, Lismore, A. A. Slack & A. McG. Stirling.

168/15. Geranium lucidum L. 101, Kintyre; limestone, woodland near Tirfergus, A. McG. Stirling & A. G. Kenneth.

169/3a. Erodium cicutarium (L.) L'Hérit. subsp. cicutarium 112, Zetland; one plant in sandy arable field near Exnaboe, Dunrossness, not seen in Shetland since 1900, R. C. Palmer.

185/2. Genista anglica L. 73, Kirkcudbright.; heathy ground, with *Antennaria dioica*, Bishops Moss, Tongland, *c.* 250 ft., H. Milne-redhead.

§ 192/11. Trifolium scabrum L. *95, Moray; Burghead, a bare bank by the lighthouse in plenty, A. J. Soutar, comm. M. McC. Webster.

212/11. Potentilla tabernaemontani Aschers. 98, Argyll; limestone cliffs, Isle of Bernera, Lismore, A. A. Slack & A. McG. Stirling.

212/12. Potentilla crantzii (Crantz) G. Beck ex Fritsch. 89, E. Perth; calcareous rocks near summit of Ben Vrackie, A. McG. Stirling.

§ 212/15. Potentilla reptans L. *95, Moray; rough ground by Hopeman harbour, A. J. Soutar, comm. M. McC. Webster.

§ 225/4. Rosa pimpinellifolia L. *77, Lanark; rocky streamside, Culter Fell, D. J. McCosh.

232/5 (7). Sorbus rupicola (Syme) Hedl. 98, Argyll; Kerrera, a single well-grown tree, A. G. Kenneth: many fine specimens on limestone cliffs, Isle of Bernera, Lismore, A. A. Slack & A. McG. Stirling.

239/8. Saxifraga tridactylites L. 98, Argyll; limestone rocks, Isle of Bernera, Lismore, A. A. Slack & A. McG. Stirling.

239/12. Saxifraga cespitosa L. 97, Westerness; several flowering clumps on north facing rocks, limestone outcrop, Geal Charn, *c.* 3,400 ft., H. Milne-redhead.

239/16. Saxifraga aizoides L. 98, Argyll; near Achadun Castle, Lismore, at sea level, A. McG. Stirling.

254/7. Epilobium tetragonum L. (*E. adnatum* Griseb.) 98, Argyll; Pass of Melfort, E. C. Wallace & A. G. Kenneth.

§†254/13. Epilobium nerterioides Cunn. *43, Radnor; foot of Clairwen Dam, 1961, A. Jones (Hb. Mus. Wales, NMW): ‡50, Denb.; two miles east of Bwlchgwyn, patches many square yards on stony hillside, 1960, Miss H. Spencer (Hb. Mus. Wales, NMW), both comm. S. G. Harrison: near Rhydtalog, 6 miles north-west of Wrexham, apparently isolated patch, 1964, A. G. Spencer (1965, *Nature in Wales*, **9**, 75).

§ 276/1. Myrrhis odorata (L.) Scop. ‡†10, Wight; Brading Marsh, 1965, Mrs M. Seabroke (1967, *Proc. Isle Wight nat. Hist. archaeol. Soc.*, **5**, 448).

§ 282/1. Conium maculatum L. *†98, Argyll; Kerrera, near Glen Castle, probably not native in this locality, A. McG. Stirling & A. G. Kenneth.

283/4. Bupleurum tenuissimum L. 61, S.-E. York.; top of river bank near Skeffling —now the most northerly locality in the British Isles as the species has disappeared from Teeside, etc., E. Crackles & P. M. Garnett (1967, *Naturalist*, **1967**, 32).

§ 291/1. Carum verticillatum (L.) Koch. *11, S. Hants.; near Minstead, R. P. Bowman.

306/1. Ligusticum scoticum L. 104, N. Ebudes; under wall of boathouse, Dunvegan Castle, Skye, M. Edmunds.

§†308/1. Levisticum officinale Koch. *101, Kintyre; Island of Cara, relic of cultivation, A. G. Kenneth.

§ 320/2. Polygonum raii Bab. ‡112, Zetland; Sands of Burrafirth, Unst. (no date), ex Hb. A. Craig-Christie (Hb. Edinb., E), conf. B. T. Styles; recorded from here by Craig-Christie (1870), but queried by Druce in *Flora Zetlandica*, R. C. Palmer.

†320/21. Polygonum polystachyum Wall. ex Meisn. 45, Pemb.; roadside at Croes-Fihangel, Crymmych, 1964, T. A. W. Davis (1964, *Nature in Wales*, **9**, 71). Erroneously reported as *P. sachalinense* F. Schmidt in *Proc. bot. Soc. Br. Isl.*, **6**, 240 (1966)—**Ed.**

322/1. Koenigia islandica L. 104, N. Ebudes; on bare stony ground from the north slope of Beinn Edra to the south of Beulah Chaiplin, M. Edmunds.

§†327/1. Soleirolia soleirolii (Req.) Dandy (*Helxine soleirolii* Req.). *27, E. Norfolk; Forncett, 1957, Miss M. B. Armstrong: brickwork of Geldeston Lock on the river Waveney, 1958, E. A. Ellis: old wall overlooking mill stream, Ellingham Mill, 1964, E. T. Daniels, all comm. E. L. Swann. The locality given as v.c. 28 in *Proc. bot. Soc. Br. Is.*, **6**, 241 (1966) is in v.c. 27, E. L. Swann. Delete v.c. 28 from C.F.—**Ed.**

333/1. Myrica gale L. 41, Glam.; near Freedown, Llanrhidian, 1965; shown as extinct in v.c. 41 in the *Atlas of British Flora*, R. M. Burton.

343/12 × 15. Salix × wardiana Leefe ex F. B. White, 112, Zetland; delete record in *Proc. bot. Soc. Br. Is.*, **3**, 296 (1959), the specimen on which the record was based being determined by K. H. Rechinger as *S. cinerea* subsp. *atrocinerea* (Brot.) Silva & Sobrinho, R. C. Palmer.

§ 343/15. Salix phylicifolia L. 112, Zetland; the specimen supporting record in *Proc. bot. Soc. Br. Is.*, **5**, 34 (1963) has been re-determined by K. H. Rechinger as *S. cinerea* subsp. *atrocinerea* (Brot.) Silva & Sobrinho; Moss's claim in *Camb. Brit. Fl.* that *S. phylicifolia* occurs in Shetland, the basis of the record in *Top. Bot. Suppl.* **2**, has no known authority; delete v.c. 112 from **C.F.**, R. C. Palmer.

343/16b. Salix repens L. subsp. argentea (Sm.) G. & A. Camus, 101, Kintyre; Island of Cora, A. G. Kenneth, conf. R. D. Meikle.

343/17. Salix lapponum L. 96, Easterness; gully north of A'Chailleach, Monadhiath Mountains, c.s.s.f. field meeting, comm, A. McG. Stirling.

†352/1. Pernettya mucronata (L.f.) Gaudich. ex Spreng. 58, Chester; wild part of Thurstaston Common, Wirral, ? bird sown, established for several years, and increasing, E. Hardy. 104, N. Ebudes; naturalised on cliffs south of Kilmarie, Loch Slapin, Skye, c.s.s.f. field meeting, comm. A. McG. Stirling.

354/1. Arctostaphylos uva-ursi (L.) Spreng. 104, N. Ebudes; abundant on steep slope below crags, Creag Dearg, Suishnish, Skye, c.s.s.f. field meeting, comm. A. McG. Stirling.

359/2. Pyrola media Sw. 98, Argyll; hills near Loch Craignish, a small colony on a heathery bank, A. G. Kenneth.

371/1. Trientalis europaea L. 98, Argyll; margin of peat bog near Pass of Melfort, Kilmelford, A. G. Kenneth & A. McG. Stirling.

§ 372/4. Anagallis minima (L.) E. H. L. Krause. ‡34, W. Glos.; on a cart track, Wigpool Common, near Drybrook, Forest of Dean, Mrs S. C. Holland, comm. D. E. de Vesian. For an earlier record see *Flora of Gloucestershire* ed. H. J. Riddelsdell, G. W. Hedley & W. R. Price, 330 (1948).—**Ed.**

§ 403/1. Echium vulgare L. *78, Peebles; railway line near Peebles, T. H. Bell, comm. D. J. McCosh.

§ 421/1. Chaenorhinum minus (L.) Lange. *78, Peebles; railway line near Peebles, T. H. Bell, comm. D. J. McCosh.

§ 430/3. Veronica catenata Pennell. 75, Ayr; wet, grassy sea-cliffs between Ballantrae and Lendalfoot, A. McG. Stirling. *98, Argyll; Kerrera, south-east end, A. McG. Stirling & A. G. Kenneth.

432/2. Pedicularis sylvatica L. subsp. hibernica D. A. Webb. 101, Kintyre; Mull of Kintyre, C. West & A. G. Kenneth, det. D. A. Webb; Danna, C. West & A. G. Kenneth, det. at Botany School, Cambridge.

§ 485/2. Galium boreale L. *78, Peebles; on rocks, Talla Reservoir, D. J. McCosh.

485/7. Galium sterneri Ehrend. 49, Caern. on a ledge of basic rock, Cwm Glas Bach, Snowdon, M. Morris. 78, Peebles; rocks in gully above Talla Linnfoots, Tweedsmuir, A. McG. Stirling.

485/10. Galium uliginosum L. 45, Pemb.; near a moorland stream, Puncheston Common, 1965, B.S.B.I. field meeting (1966, *Nature in Wales*, **10**, 43).

495/3. Valeriana dioica L. 48, Mer.; a single patch of the male plant with 14 flower stems, in a calcareous rill south-east of Dolgellau. Subsequent searches have not revealed any other patches in the area. Mrs K. M. Stevens. The only other certain previous Merioneth record is, Bog near Llanderfel, 1894, T. Ruddy, spec. in Herb. Coll. N. Wales, U.C.N.W. Bangor; this locality is now lost, P. M. Benoit (1967, *Nature in Wales*, **10**, 87).

502/1. Bidens cernua L. 68, Cheviotland; the locality printed in *Proc. bot. Soc. Br. Isl.*, **6**, 243 (1966) as a new vice-county record was given in Baker & Tate's *New Flora of Northumberland and Durham* (1868), G. A. Swan.

514/5. Filago minima (Sm.) Pers. 3, S. Devon; on bare limestone near Hope's Nose, 1961, R. M. Burton.

§ 526/3. Anthemis arvensis L. *†105, W. Ross; new sown verge to main road, west of Lochbroom, 1965, M. McC. Webster.

§†535/2. Artemisia verlotorum Lamotte. *37, Worcs.; in great quantity in front of new houses just completed on housing estate, Fladbury, J. E. Lousley & Mrs B. H. S. Russell.

537/1. Carlina vulgaris L. 104, N. Ebudes; basic rocks and scree, Carn Dearg, Suishnish, Skye, C.S.S.F. field meetings, comm. A. McG. Stirling.

543/1. Saussurea alpina (L.) DC. 104, N. Ebudes; gully between An Stac and Bla Bheinn, C.S.S.F. field meeting, comm. A. McG. Stirling.

§ 550/3. Leontodon taraxacoides (Vill.) Mérat. *108, W. Sutherland; sandy ground, Sheigra, A. G. Kenneth.

§ 552/1b. Tragopogon pratensis L. subsp. minor (Mill.) Wahlenb. *78, Peebles; railway line near Peebles, T. H. Bell, comm. D. J. McCosh.

§ 563/2. Alisma lanceolatum With. *98, Argyll; bridge over river Nant near Taynuilt, a considerable colony, first noted in 1965, A. G. Kenneth.

§ 566/1. Butomus umbellatus L. *95, Moray; ditch near a quarry hole, Hamlets, Lossiemouth, probably introduced by birds, M. McC. Webster.

†570/2. Elodea ernstae St. John (*E. callitrichoides* auct.), *23, Oxon; stagnant ditch near Beard Mill, Stanton Harcourt, R. C. Palmer, det. H. St. John.

576/2. Zostera angustifolia (Hornem.) Reichb. 74, Wigton, shore of Loch Ryan, Stranraer, with *Z. noltii*, A. McG. Stirling.

§ 577/7. Potamogeton alpinus Balb. 89, E. Perth; Loch Mharaich, near Kirkmichael, 1965, U. K. Duncan, conf. J. E. Dandy & Sir George Taylor. *112, Zetland; Loch of Voe, Delting, R. C. Palmer, conf. J. E. Dandy.

§ 577/14. Potamogeton obtusifolius Mert. & Koch. ‡H.20, Wicklow; stream running through sand dunes south of Mizen Head, Buckroney area, 1965, E. M. Booth & M. J. P. Scannell, conf. J. E. Dandy (1966, *Ir. Nat. J.*, **15**, 243).

§†595/1. Tulipa sylvestris L. *95, Moray; well established in woods at Gordonstown Duffus, M. McC. Webster.

†607/11. Allium paradoxum (Bieb.) G. Don. 90, Forfar; roadside between Arbirlot and Easter Bonhard near Arbroath, in several places, U. K. Duncan.

§ 643/2b. Dactylorhiza maculata (L.) Soó subsp. ericetorum (E. F. Linton) P. F. Hunt & Summerhayes (*Dactylorchis maculata* (L.) Vermeul. subsp. *ericetorum* (E. F. Linton) Vermeul.). *77, Lanark; Culter, D. J. McCosh.

§ 643/5. Dactylorhiza purpurella (T. & T. A. Stephenson) Soó (*Dactylorchis purpurella* (T. & T. A. Stephenson) Vermeul.) *77, Lanark; Culter, 1956→, D. J. McCosh.

§ 649/2. Arum italicum Mill. subsp. neglectum (Townsend) Prime *†14, E. Sussex; near Burgess Hill, on the Cuckfield Road, evidently of garden origin, 1965, R. C. Palmer.

§ 651/1. Wolffia arrhiza (L.) Hork. ex Wimm. *34, W. Glos.; pool in derelict water-garden, Westbury Court, Westbury on Severn, Cdr. & Mrs Dudley-smith, comm. D. E. de Vesian.

§ 654/2 Eriophorum gracile Roth. *H.16, W. Galway; Lough Cregduff, Connemara, F. Rose.

§ 658/1. Cyperus longus L. *†13, W. Sussex; damp ground by roadside near Old Shoreham, a large patch looking established but questionably native, 1965, R. C. Palmer.

†658/v. Cyperus vegetus Willd. 1, W. Cornwall; St. Just, roadside verge, in crack between road and stone wall, not far from houses, E. L. Williams, comm. C. A. Stace.

§ 663/22. Carex pendula Huds. *80, Roxburgh; shaded rocky river bank, Atterson's Crook, Liddel Water, *c.* 250 ft., H. Milne-redhead.

663/54. Carex paniculata L. 101, Kintyre; Island of Cara, in some quantity in gullies at south end, A. G. Kenneth.

663/60. Carex disticha Huds. 101, Kintyre; Island of Cara, rare in marshy ground, A. G. Kenneth.

§ 669/3. Glyceria declinata Bréb. *112, Zetland; muddy depression in field by Burn of Weisdale below Kergord, R. C. Palmer, conf. M. Borrill.

670/4. Festuca altissima All. 106, E. Ross; under conifers, bank of river Glass near Evanton, U. K. Duncan.

674/2. Catapodium marinum (L.) C. E. Hubbard. 95, Moray; grass dunes, Lossiemouth, A. J. Soutar: sand dunes, Burghead, R. Richter, both comm. M. McC. Webster. 108, W. Sutherland; dunes at Clachtoll, M. McC. Webster.

676/5. Poa flexuosa Sm. 97, Westerness; scree, Coire Ardain, Laggan, M. McC. Webster, conf. C. E. Hubbard.

681/2. Melica nutans L. 104, N. Ebudes; limestone rocks by Allt nan Leac, Torrin, Skye, c.s.s.f. field meeting, comm. A. McG. Stirling.

§ 683/13. Bromus lepidus Holmberg. *101, Kintyre; Auchinhoan near Campbeltown; Danna, the typical plant and the var. *micromollis* (Krösche) are present in both localities, A. McG. Stirling & A. G. Kenneth, det. C. E. Hubbard.

†697/3. Aira multiculmis Dumort. 90, Forfar; railway embankment, Friockheim, 1964, U. K. Duncan, conf. A. Melderis.

§ 701/4. Agrostis gigantea Roth. *112, Zetland; weed in sandy field near Exnaboe, Dunrossness, R. C. Palmer, conf. T. G. Tutin.

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to E. B. Bangerter and J. E. Lousley for their assistance.

SYNOPSIS

	Page
Systematic, etc.	33
Topographical	53
Ecological (See also Topographical)	55
Phytosociological	56
Historical	57
Biographical	58
Obituaries	58
Palaeobotany	58
Herbarium, Laboratory, Recording techniques, etc.	58
Nomenclature and Botanical Terminology	59
Miscellaneous	60

SYSTEMATIC, ETC.

2. SELAGINELLA. Reed, C. F., 1966, Index Selaginellum, *Mems. Soc. broteriana*, **18,** 5-287.

4. EQUISETUM. Hauke, R., 1963, A taxonomic monograph of the genus Equisetum subgenus Hippochaete, *Beih. Nova Hedw.*, **8,** 1-123 + 12 tables, 3 graphs and 22 plates.

7. HYMENOPHYLLUM. Evans, G. B., 1966, The identification of British Hymenophyllum species, *Br. Fern Gaz.*, **9,** 256-262. The most reliable and convenient criterion for identifying fertile material of the two species of *Hymenophyllum* found in Britain concerns the indusial valves. In *H. wilsonii* the edges are quite entire, whereas in *H. tunbrigense* the distal edges are raggedly toothed.—[D.H.K.]

7/1. HYMENOPHYLLUM TUNBRIGENSE (L.) Sm. Aitken, W. & Gunning, M., 1966, Hymenophyllum tunbrigense Sm. in Glendun, Co. Antrim, *Ir. Nat. J.*, **15,** 210. The recent discovery of *Hymenophyllum tunbrigense* growing in quantity in Craigagh Wood, Glendun, Co. Antrim confirms an old record made in 1884. —[D.H.K.]

15. ASPLENIUM. Lovis, J. D., Melzer, H. & Reichstein, T., 1966, Asplenium × stiriacum D. E. Meyer emend. und A. × aprutanium hybr. nov., die zwei Asplenium lepidum × trichomanes-Bastarde, *Bauhinia*, **3,** 87-95. Two cytologically and morphologically distinct hybrids exist in nature between *Asplenium lepidum* and *A. trichomanes*. One, a triploid, is the hybrid between *A. lepidum* and *A. trichomanes* subsp. *inexpectans*, the other, a tetraploid, is the hybrid between *A. lepidum* and *A. trichomanes* subsp. *quadrivalens*.

The known occurrences of these two hybrids are described and the morphological differences between them are indicated. One of them, the tetraploid, corresponds to the holotype of the *A.* × *stiriacum* of D. E. Meyer. The diagnosis of this taxon is amended to exclude the tetraploid hybrid which is described as *A.* × *aprutianum*, hybr. nov.

Study of the chromosome pairing in these hybrids indicates that *A. lepidum* is of allopolyploid origin, and supports the view that *A. trichomanes* subsp. *quadrivalens* is of fundamentally autopolyploid origin.—[Authors' summary]

15/8. ASPLENIUM SEPTENTRIONALE (L.) Hoffm. Bannister, P. and McAllister, H. A., 1966, Asplenium septentrionale (L.) Hoffm. in W. Galway, *Ir. Nat. J.*, **15**, 149, About 20 plants of *Asplenium septentrionale* were discovered in two rocky outcrops near Roundstone, West Galway, in June 1965, and the species is thought to be native in this habitat. The only previous record from Ireland was from Co. Down, some 180 miles away from Roundstone, where the plant was considered to be an introduction (cf. Praeger, R. L., 1912, *Ir. Nat. J.*, **12**, 154).—[D.H.K.]

20. WOODSIA. Kurita, S., 1965, Chromosome numbers and systematic position of the genus Woodsia, *J. Jap. Bot.*, **40**, 358-362.

21. DRYOPTERIS. Britton, D. M., 1966, The cytology and distribution of Dryopteris species in Ontario, *Can. J. Bot.*, **44**, 63-78. The cytology and distribution, together with some morphological notes and a key, are given for nine species of *Dryopteris* (wood ferns) in Ontario. The cytological determinations were made on 239 plants of nine species considered as five diploid species ($x = 41$) (*Dryopteris marginalis D. fragrans*, *D. goldiana*, *D. dilatata* and *D. intermedia*), three tetraploid species ($n = 82$) (*D. spinulosa*, *D. cristata* and *D. filix-mas*), and one hexaploid species ($n = 123$) (*D. clintoniana*).—[Author's summary].

21. DRYOPTERIS. Hirabayashi, H., 1966, Chromosome numbers in Japanese species of Dryopteris (1), *J. Jap. Bot.*, **41**, 11-13.

21/4. DRYOPTERIS VILLARII (Bellardi) Woynar. Gilbert, O. L., 1966, Dryopteris villarii in Britain, *Br. Fern Gaz.*, **9**, 263-268. The history, distribution, ecology and habitats of *Dryopteris villarii* in Britain are reviewed and discussed.—[D.H.K.]

22. POLYSTICHUM. Vida, G., 1966, Cytology of Polystichum in Hungary, *Bot. Közl.*, **53**, 137-144. Four species of *Polystichum* and three interspecific hybrids were collected from various localities in Hungary. Cytological examination showed that *P. lonchitis* and *P. setiferum* were diploids, that *P. aculeatum* and *P. braunii* were tetraploids, that *P.* × *illyricum* Hahne (*P. aculeatum* × *lonchitis*) and *P.* × *bicknellii* (Christ) Hahne (*P. aculeatum* × *setiferum*) were triploids, and that *P.* × *luerssenii* (Dörfler) Hahne was probably an allotetraploid.—[D.H.K.]

24. THELYPTERIS. Wagner, W. H., 1966, New data on North American Oak Ferns, Gymnocarpium, *Rhodora*, **68**, 121-138. Cytological and taxonomical studies on *Thelypteris dryopteris* and *T. robertiana*, including the description of a new hybrid —*Gymnocarpium heterosporum* Wagner, nov. sp.—between the two species. *G. heterosporum* is regarded as an apomictic species in view of the fact that it has been found to be of widespread occurrence in North America.—[D.H.K.]

25. POLYPODIUM. Benoit, P. M., 1966, Some recent work in Wales on the Polypodium vulgare aggregate, *Br. Fern Gaz.*, **9**, 277-282. Studies on the *Polypodium vulgare* complex in Wales has shown that the pentaploid hybrid *P. interjectum* × *vulgare* is common wherever the parent species grow together. Habitats and spore characters of the various segregates are discussed.—[D.H.K.]

25/a. POLYPODIUM AUSTRALE Fée. Roberts, R. H. 1966, Some observations on Polypodium australe, *Br. Fern Gaz.*, **9**, 283-287. Notes on the variation in British material of *Polypodium australe*, which is considerably greater than previously realized.—[D.H.K.]

30.→ GYMNOSPERMAE. Edlin, H. L., 1966, *Know Your Conifers*, Pp. 56. Forestry Commission. H.M.S.O. London. Price 5/-.

32. LARIX. Axelsson, R., 1966, Fn frökaraktär av värde vid Särskiljane av frö från Larix decidua och Larix leptolepis, *Bot. Tidskr.*, **60**, 310-314. The author

describes a method by which seeds of *Larix decidua* and *L. leptolepis.* may be distinguished from each other by means of the characteristic elevation of the seed coats.—[D.H.K.]

36.→ RANUNCULACEAE. Zimmerman, W., 1966, Über die Phylogenie und das System der Ranunculaceae, *Feddes Rep.*, **73**, 1-16.

38/1. HELLEBORUS FOETIDUS L. Carter, H., 1966, Helleborus foetidus L. on Moncreiffe Hill, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 42. Notes on a colony of *Helleborus foetidus* on Moncreiffe Hill, Perthshire. The species, which is not native in Scotland, was sown on the hill nearly a century ago and appears to be maintaining its hold despite alterations in the woodland flora.—[D.H.K.]

46/10. RANUNCULUS AURICOMUS L. Rutishauser, A., 1966, Genetik der Pseudogamie bei Ranunculus auricomus *s.l.* W. Koch, *Ber. schweiz. bot. Ges.*, **75**, 157-182. Experimental studies on the *Ranunculus auricomus* complex, chiefly concerning the results of hybridisation experiments with diploid, sexual *R. cassubicifolius* ($2n = 16$) and tetraploid, pseudogamous *R. megacarpus* ($2n = 36$).—[D.H.K.]

46/16.→ RANUNCULUS subgenus BATRACHIUM. Cook, C. D. K., 1966, A monographic study of Ranunculus subgenus Batrachium (DC.) A. Gray, *Mitt. Bot. Staatssaml., Münch.*, **6**, 47-237. A revision, on a world wide basis, of *Ranunculus* subgenus *Batrachium*, with full descriptions, synonymy, keys to the identification of species, distribution maps, ecological data, references to illustrations of the various species and an excellent bibliography. The correct name for *R. peltatus* Schrank subsp. *pseudofluitans* (Syme) C. D. K. Cook (*R. pseudofluitans* (Syme) Newb. ex Bak. & Foggitt) is **R. penicillatus** (Dumort) Bab. Three varieties of this are recognised: var. **penicillatus,** found in south-west England, the west Midlands and Ireland; var. **calcareus** (Butcher) C. D. K. Cook, comb. nov. (*R. calcareus* Butcher) from south-east England and the Midlands, and var. **vertumnus,** var. nov. described from near Basingstoke, Hampshire.—[D.H.K.]

46/24. RANUNCULUS FICARIA L. Andreas, C. H., 1966, Enkele infraspecifieke taxa bij Ranunculus ficaria L., *Gorteria*, **3**, 11-12. The author draws attention to two forms of *Ranunculus ficaria*, one with axillary bulbils and a small number of well-developed achenes, the other with no axillary bulbils and many well-developed achenes. Only the former is up till now known from the Netherlands.—[Author's Summary]

46/24. RANUNCULUS FICARIA L. Laegaard, S., 1966, Ranunculus ficaria ssp. fertilis in Denmark, *Bot. Tidsskr.*, **61**, 295-297. The discovery of the diploid *Ranunculus ficaria* subsp. *fertilis* ($2n = 16$) in Denmark is reported. Comments on its morphology, ecology and distribution are given together with a short discussion on its nomenclature and taxonomic status.—[D.H.K.]

67.→ CRUCIFERAE. Mulligan, G. A., 1966, Chromosome numbers of the family Cruciferae, 3, *Can. J. Bot.*, **44**, 309-319. Chromosome counts are provided for North American material of the genera *Draba*, *Erophila* and *Erysimum*. *Erophila verna* from the United States was found to have $n = 15$, and material from British Columbia, $2n = 19$.—[D.H.K.]

77. CAKILE. Pobedimova, E., 1964, Genus Cakile Mill. (Pars Specialis), *Novit. Syst. Plant. Vasc.*, **1964**, 90-128.

94. DRABA. Knaben, G., 1966, Cytotaxonomical studies in some Draba species, *Bot. notiser*, **119**, 427-444. Studies on a number of Scandinavian species of the genus *Draba*, including *D. norvegica*.—[D.H.K.]

102. RORIPPA. Stuckey, R. L., 1966, Taxonomic and geographical relationships in North American Rorippa, *Am. J. Bot.*, **53**, 631.

102/3. RORIPPA SYLVESTRIS (L.) Bess. Stuckey, R. L., 1966, The distribution of Rorippa sylvestris (Cruciferae) in North America, *Sida*, **2**, 361-376. *Rorippa sylvestris* was introduced into North America from Europe in the early nineteenth century. A review of its present distribution shows that it is common east of the Mississippi River in the north-eastern United States and southern Canada, where it grows along the sides of rivers, streams, ditches, etc. on road verges and rubbish-tips, etc. It occurs also as a garden weed. The history of its spread, and the factors involved in this are discussed. The spread which in certain areas has been rapid, has been almost entirely by vegetative means, dispersal by seed appearing to have played little or no part.—[D.H.K.]

104. HESPERIS. Dvořák, F., 1966, Ad Hesperis L. generis specio in Haemo crescentes aliquae, *Preslia*, **38**, 57-64. A part revision of the genus *Hesperis* including the description of five new species.—[D.H.K.]

104. HESPERIS. Dvořák, F., 1966, A contribution to the study of the evolution of Hesperis series Matronales Cvel. emend. Dvořák, *Feddes Rep.*, **73**, 94-99. The phylogeny of the various species of *Hesperis* series *Matronales* is outlined.—[D.H.K.]

108/2. SISYMBRIUM IRIO L. Khoshoo, T. N., 1966, Biosystematics of Sisymbrium irio complex, 12. Distributional pattern, *Caryologia*, **19**, 143-150. The diploid race of *Sisymbrium irio* has a northern distribution both in Europe and the Indian subcontinent, and is the only race known from Europe. The tetraploid race is southern and wider in distribution and is the most common race in the Indian subcontinent. The hexaploid race is known primarily from the Punjab, including Pakistan, wherever diploid and tetraploid races come together. The octoploid race, known only from the Indian subcontinent, is strictly a very recently developed taxon.

The wide distribution of the species complex as a whole is due to its genetic system which meets the requirements of the 'perfect weed'.—[D.H.K.]

123. SILENE. Damboldt, J. & Phitos, D., 1966, Ein Beitrag zur Zytotaxonomie der Gattung Silene L. in Griechenland, *Öst. bot. Z.*, **113**, 169-175. Cytotaxonomic studies on *Silene* in Greece, including notes on *Silene vulgaris* subsp. *vulgaris* and *S. conica*.—[D.H.K.]

123/10. SILENE NUTANS L. Debray, M., 1965, Sur une variété Franco-britannique de Silene nutans L., *Rev. Soc. sav. hte. Normandie*, **39**, 21-24. Several gatherings of *Silene nutans* from Normandy, Boulogne and the Paris area are identified as var. *salmoniana* Hepper, known from south-east England, particularly from coastal areas. This confers on the variety the character of a Franco-British race. Morphological and geographical details are provided and the interest noted of the study of gatherings from other sources, particularly in Normandy.—[Author's summary, translated by E.B.B.]

127. DIANTHUS. Kowal, T. & Wojterska, H., 1966, Studia systematyczne nad nasionami rodzaju Dianthus L., *Monographiae bot.*, **21**, 271-297. Systematic studies on the seeds of 42 species and 3 varieties of the genus *Dianthus*. Distinct differences occur only between extreme species, nevertheless identification of *Dianthus* species by means of seed characters is possible in certain cases.—[D.H.K.]

131. CERASTIUM. Kaleva, K., 1966, Biosystematic notes on Cerastium biebersteinii DC. and some ornamental strains of C. tomentosum L. (Caryophyllaceae), *Annls. Bot. Fenn.*, **3**, 100-109. Two Finnish ornamental strains of *Cerastium tomentosum* and one strain of *C. biebersteinii* of wild Crimean origin have been studied. The flatness of the capsule teeth margins which is commonly used as a differential character in separating the two species does not seem to be a valid distinction. On the other hand *C. biebersteinii* can be separated from *C. tomentosum* by a number of other characters, e.g. the structure of the capsule wall and the size of the seeds. Chromosome counts showed that *C. biebersteinii* had $2n = 36$,

while the *C. tomentosum* strains had $2n = 72$. The latter number has also been reported from ornamental strains called '*C biebersteinii*'. Previous counts on *C. tomentosum* have given the somatic numbers 26, 38, 72 and 108, the latter being the only record for material of wild origin. Finally the possible presence of the hybrid *C. arvense* × *tomentosum* in Finland is reported.—[D.H.K.]

131. CERASTIUM. Shinners, L. H., 1966, Cerastium glutinosum Fries (Caryophyllaceae) in Mississippi: new to North America, *Sida*, **2**, 392-393. The discovery of the Eurasiatic species *Cerastium glutinosum* Fr. as an adventive new to North America is reported, and a key provided to the species of *Cerastium* found in the south-eastern United States.—[D.H.K.]

137/r. MINUARTIA RECURVA (All.) Schinz & Thell. Moore, J. J., 1966, Minuartia recurva (All.) Schinz & Thell. new to the British Islands, *Ir. Nat. J.*, **15**, 130-132. An account of the discovery of *Minuartia recurva* in Co. Cork and Co. Kerry, Irish Republic, in 1964. The species is new to the British Isles and lists of associated species and some ecological data are given. The occurrence of *M. recurva* in Ireland represents a considerable extension of the previously known range of the species, the nearest recorded stations being in the Cordilleran Mountains of northern Spain over 600 miles away.

The key for the genus *Minuartia* given in Clapham, Tutin and Warburg *Flora of the British Isles*, edition 2 (1962) is modified as follows:—

3	Pedicels glabrous; lvs 1-veined	*stricta*	
	Pedicels glandular-hairy,; lvs 3-veined		4
4	Sepals 3-veined; seeds papillose	*verna*	
	Sepals 5-7-veined; seeds smooth	*recurva*	

Dr G. Halliday has examined the Irish plants cytologically and found that they have $2n = 30$ which is in accordance with counts on made material from France and Switzerland.—[D.H.K.]

142. SPERGULA. Kowal, T., 1966, Studia systematyczne nad nasionami rodzajow Delia Dum., Spergula L. i Spergularia Presl, *Monographiae bot.*, **21**, 245-270. Systematic studies on the seeds of *Delia*, *Spergula* and *Spergularia*, with keys to their identification, and illustrations of the various seeds.—[D.H.K.]

143. SPERGULARIA.—See 142. SPERGULA.

148. SCLERANTHUS. Van Ooststroom, S. J. & Reichgelt, T. J., 1966, Scleranthus polycarpos L. nieuw voor Nederland, *Gorteria*, **3**, 28-29. *Scleranthus polycarpos* L. appears to be indigenous in the Netherlands. In contradistinction to its close ally *S. annuus*, which is almost exclusively a weed in cultivated ground on sandy soil, *S. polycarpos* occurs in more natural habitats.—[Author's summary]

148/P. PARONYCHIA. Borhidi, A., 1966, The variability range of Paronychia cephalotes (M.B.) Bess, and new data to the knowledge of South-European Paronychia species *Acta bot. hung.*, **12**, 33-40.

149. MONTIA. Nilsson, O., 1966, Studies in Montia L. and Claytonia L. and allied genera, 2. Some chromosome numbers, *Bot. notiser*, **119**, 464-468. The following chromosome numbers are given:— *Montia fontana* L. *sensu lato* (material from Scandinavia, Faroe Islands, Iceland, Greenland and Alaska), $2n = 20$; (from Sweden), $2n = 40$; *M. rivularis* (cultivated material from Belgium, Portugal and Greece), $2n = 20$: *M. perfoliata* (material from the United States), $2n = 12$, 24 and 36: (cultivated material from the Chelsea Physic Garden, London), $2n = 36$: *M. sibirica* (material from the United States), $2n = 24$ and 48.—[D.H.K.]

149. MONTIA. Swanson, J. R., 1966, A synopsis of relationships in Montioideae (Portulacaceae), *Brittonia*, **18**, 229-241. Studies on *Claytonia* and *Montia* and their

natural relationships. Previous data on the two genera are reviewed and details of the sections within each genus are given and defined.—[D.H.K.]

150. CLAYTONIA.—See 149. MONTIA.

154/13. × 2. CHENOPODIUM × PERHYBRIDUM. Ponert, J., 1966, Chenopodium × perhybridum Ponert, sp. hybr. nov. = Chenopodium hybridum × Chenopodium polyspermum, *Feddes Rep.*, **73**, 100-102. *Chenopodium × perhybridum* Ponert, hybr. nov. (*C. hybridum × polyspermum*), is described and figured from Czechoslovakia. The following description is provided:— Plant annual, stem 20-50 cm tall, branched. Terminal panicle conspicuous, panicle branches short. Leaves ± ovate, toothed, or similar in appearance to the leaves of *C. hybridum*, but smaller, cordate to cuneate at the base, ± glabrous. Glomerules pedunculate, not glabrous. Seeds 1·5-2 mm.—[D.H.K.]

163/1 × 2. MALVA × INODORA. Ponert, J., 1966, Malva × inodora Ponert, sp. hybr. nov. = Malva moschata × Malva sylvestris subsp. sylvestris, *Feddes Rep.*, **73**, 90-93. *Malva × inodora* Ponert, hybr. nov. (*M. moschata × sylvestris* subsp. *sylvestris*), is described and figured from Czechoslovakia. Mention is made also of *M. neglecta × sylvestris* subsp. *sylvestris = M. × zoernigii* Fleischer, from the same country.

M. × inodora is described as follows:— Plant biennial or perennial, stem 40-70 cm tall, hairy, ± straight, or branching. Leaves small, 5-7 lobed, upper leaves larger with 5-7 palmate segments, rounded or toothed at the apex. Flowers small, single, in the leaf axils. Calyx leaves linear to oblong-lanceolate, 1-2 × 3-5 mm, ciliate. Petals rose, ± cuneate-obcordate, 22-35 mm long. Nutlets hairy.—[D.H.K.]

168/T. TROPAEOLUM. Sparre, B., 1966, Studies in pre-Linnean and early Linnean Tropaeolum taxonomy and nomenclature, 1. Tropaeolum peregrinum L., *Bot. notiser*, **119**, 326-331. Studies of early botanical works and herbarium material has shown that *Tropaeolum peregrinum* L. *sensu lato*, includes *T. smithii* DC., *T. peregrinum* L. *sensu stricto*, *T. seemanii* Bach., *T. calcaratum* Sparre, sp. nov. and *T. hayneanum* Bernh. Descriptions of these species are provided together with synonymy, geographical range and history.—[D.H.K.]

171. IMPATIENS. Jones, K. & Smith, J. M. B., 1966, The cytogeography of Impatiens L. (Balsaminaceae), *Kew Bull.*, **20**, 63-72.

171/R. RHUS RADICANS L. Van der Ploeg, D. T. E., 1966, Rhus radicans L. in Friesland, *Gorteria*, **3**, 30-31. About the year 1919 cuttings of the North American poison ivy, *Rhus radicans* L., were planted to consolidate a dike between two lakes in the south-western part of Friesland, Marra and Vogelhoek. The species has completely established itself there, and at present as a real liana, it covers nearly the whole dike and its willow-vegetation over a distance of about 500 metres. To some extent the poisonous plant means a danger to the inhabitants of the neighbouring villages, especially to the children, who go there swimming and picking blackberries. Some cases of an obstinate eczema have already occurred. Parents warn their children against the 'poisonous trees' of Vogelhoek!—[Author's summary]

173/1. ACER PSEUDOPLATANUS L. Okali, D. U. U., 1966, A comparative study of the ecologically related tree species Acer pseudo-platanus and Fraxinus excelsior, 1. The analysis of seedling distribution, *J. Ecol.*, **54**, 129-141. Indigenous ashwoods in north Derbyshire have been invaded to varying degrees by seedlings of the introduced species *Acer pseudoplatanus*. Studies were carried out on selected sites to attempt to define the conditions controlling this invasion. The general conclusion reached was that *Fraxinus* seedlings probably persist longer in shade and this may eventually have a distinct advantage over the invading *Acer pseudoplatanus*.—[D.H.K.]: 2, The analysis of adult tree distribution, *loc. cit.*, **54**, 419-425.

176/1. Ilex aquifolium L. Peterken, G. F., 1966, Mortality of holly (Ilex aquifolium) seedlings in relation to natural regeneration in the New Forest, *J. Ecol.*, **54**, 259-269. Among the factors which directly or indirectly cause the death of holly seedlings, lack of soil moisture, deep shade, nibbling, browsing and physical disturbance appear to be the most important. The great majority die before their fifth year, but effective regeneration is still possible by the remainder. Under present day conditions the growth of older seedlings is checked by heavy browsing which is, therefore, the factor preventing regeneration, but potential regeneration is apparently restricted to certain habitats by the quantity of light available to the younger seedlings.—[Author's summary]

177/1. Euonymus europaeus L. Kotov, M., 1966, Euonymus europea L. and its variability, *Uk. bot. Zh.*, **23**, 102-105.

192/24. Trifolium micranthum Viv. de Visser, A., 1966, Een nieuwe groeiplaats van Trifolium micranthum Viv., *Gorteria*, **3**, 1-2. Ecological notes on *Trifolium micranthum* in the Netherlands.—[D.H.K.]

192/24. Trifolium micranthum Viv. Van der Ploeg, D. T. E., 1966, Nogmaals Trifolium micranthum Viv., *Gorteria*, **3**, 48. Notes on the distribution of *Trifolium micranthum* in the Netherlands, with particular emphasis on recently discovered stations.—[D.H.K.]

195. Lotus. Chrtková-Žertova, A., 1966, Studie über die tschecholowakischen Arten der Gattung Lotus, 4, *Preslia*, **38**, 36-47.

195/3. Lotus uliginosus Schkuhr. Forde, J. & Thomas, R. G., 1966, Flowering in Lotus pedunculatus Cav., 1. Effects of photoperiod, *N.Z. Jl Bot.*, **4**, 147-152.

201. Oxytropis. Leins, P. & Merxmüller, H., 1966, Zur Gliederung der Oxytropis campestris-Gruppe, *Mitt. bot. Staatssaml., Münch.* **6**, 19-31. A revision of the *Oxytropis campestris* group.—[D.H.K.]

207. Lathyrus. Bässler, M., 1966, Die Stellung des Subgenus Orobus (L.) Baker in der Gattung Lathyrus L. und seine systematische Gleiderung, *Feddes Rep.*, **72**, 69-97. A revision of *Lathyrus* Subgenus *Orobus*.—[D.H.K.]

207. Lathyrus. Czefranova, Z., 1965, Conspectus criticus Specierum Sectionis Orobus (L.) Gr. et Godr. Generis Lathyrus, *Novit. Syst. Plant. vasc.*, **1965**, 152-167.

207/S. Scorpiurus. Heyn, C. H. & Raviv, V., 1966, Experimental taxonomic studies in the genus Scorpiurus (Papilionaceae), *Bull. Torrey bot. Club*, **93**, 259-267. Studies on pod characters, together with cytological and genetical data obtained in the course of these studies lead the authors to the conclusion that in the genus *Scorpiurus* only two species should be recognised. The genus is revised and the following key provided:

Flowers orange, usually single, pods 6-8 mm. wide.
  Projections on pod club-shaped .. .. *S. vermiculatus* L.

Flowers yellow, (2) 3-5 (8). Pods 3 (4) mm. wide.
  Projections on pod—tubercles or spines .. .. *S. muricatus* L. *sensu lato*

  Pods with smooth or tubercled ribs, usually coiled in
    one place .. .. var. *muricatus*
    (*S. sulcatus* L. pro parte)
  Pods spiny, usually twisted
    var. *subvillosus* (L.) Fiori (*S. subvillosus* L.) *S. sulcatus* L. pro parte).
    [D.H.K.]

208.→ Rosaceae. Retisma, T., 1966, Pollen morphology of some European Rosaceae, *Acta bot. neerl.*, **15**, 290-307. Preliminary studies on the pollen morphology of various western European species of the family Rosaceae.—[D.H.K.]

212/11. POTENTILLA TABERNAEMONTANI Aschers. Rodway, G. & Stirling, A. McG., 1966, Spring Cinquefoil (Potentilla tabernaemontani) in Argyll, *Glasg. Nat.*, **18,** 451. A new locality is reported for *Potentilla tabernaemontani* in Argyll. It is a rare species in Scotland.—[D.H.K.]

213/1. SIBBALDIA PROCUMBENS L. Coker, P. D., 1966, Sibbaldia procumbens L. (Biological Flora), *J. Ecol.*, **54,** 823-831.

215. FRAGARIA. Bringhurst, R. S., Senanayake, Y. D. A. & Kahn, D. A., 1966, Fragaria polyploids, chromatographic analysis, *Amer. J. Bot.*, **53,** 638.

217. DRYAS. Elkington, T. T., 1965, Studies on the variation of the genus Dryas in Greenland, *Meddr. Grønland*, **178,** 1-56.

227. COTONEASTER. Flinck, K. E. & Hylmo, B., 1966, A list of series and species in the genus Cotoneaster, *Bot. notiser*, **119,** 445-463.

229/2. CRATAEGUS MONOGYNA Jacq. Gilbert, J. L., 1966, Yellow-berried Haw, *Gdnrs'. Chron.*, **1966,** 12. The author traces the history of the yellow-fruited hawthorn—*Crataegus monogyna* 'Aurea' in Britain, and attempts to unravel the confused nomenclature of the shrub.—[D.H.K.]

232. SORBUS. Kárpáti, Z., Adatok az északi Kárpátok Sorbus-ainak ismeretéhez, *Bot. Közl.*, **52,** 135-140. Eight new species of *Sorbus* are described from the Carpathians.—[D.H.K.]

249/j. LYTHRUM JUNCEUM Banks & Solander. Toman, J. & Stavý, F., 1966, Lythrum junceum Banks ex Soland. in Russ.—eine in die Tschechoslowakei; neu eingeschleppte Art, *Preslia*, **38,** 263-266. The distribution and spread of the adventive *Lythrum junceum* in eastern and central Europe, and particularly Czechoslovakia is reviewed.—[D.H.K.]

253/1. LUDWIGIA PALUSTRIS (L.) Ell. Sipkes, C., 1966, Het waterpeltje, Ludwigia palustris (L.) Elliot, in de Belgische Kempen, *Gorteria*, **3,** 2-4. Reports the rediscovery of *Ludwigia palustris* in Belgium.—[D.H.K.]

254. EPILOBIUM. Myerscough, P. J. & Whitehead, F. H., 1966, Comparative biology of Tussilago farfara L., Chamaenerion angustifolium (L.) Scop., Epilobium montanum L. and Epilobium adenocaulon Hausskn., 1. General biology and germination, *New Phytol.*, **65,** 192-210. The four species investigated are all known to colonise areas disturbed by man but have different distribution patterns. A study of their comparative biology was made in an attempt to account for these differences. *Epilobium* (*Chamaenerion*) *angustifolium* appeared to need particularly high mineral nutritional requirement, and germination in dry conditions was found to occur less readily in that species than in *E. adenocaulon. E. montanum* was found to be the most shade tolerant of the four species studied. *Tussilago farfara* appeared to be the most calcicole and *Epilobium angustifolium* the most calcifuge species.—[D.H.K.]

254/13. EPILOBIUM NERTERIOIDES Cunn. Evans, R. E., 1966, Discovery of Epilobium nerterioides in Warwickshire, *Proc. Bgham. nat. Hist. phil. Soc.*, **20** (5), 18. Reports the discovery in Wroxall Churchyard of the adventive *Epilobium nerterioides*, a native of New Zealand.—[D.H.K.]

255/1. EPILOBIUM ANGUSTIFOLIUM L. Mosquin, T., 1966, A new taxonomy for Epilobium angustifolium L. (Onagraceae), *Brittonia*, **18,** 167-188. The Eurasiatic species *Epilobium angustifolium* has been studied over its geographical range and has been found to be a morphologically variable plant forming a complex series of integrating races. It is accordingly divided into two subspecies:— subsp. *angustifolium*, ($n = 18$), widespread in Eurasia and in North America. The chromosome number $n = 54$, is also reported for this subspecies from Japan. The second subspecies is subsp. *circumvagum* Mosquin, subsp. nov. ($n = 36$), based on *Chamaenerion angustifolium* (L.) Scop. var. *platyphyllum* Daniels (1911), which occurs from southern Canada and the United States, extending to the Arctic, and along the Pacific Coast. In Eurasia it extends in a narrow belt from Kamchatka to Japan, Korea, Manchuria, Southern China, southern slopes of the Himalayas to Afghanistan and Turkey.

E. angustifolium subsp. *circumvagum* has leaf midribs glabrous to very pubescent (always glabrous in subsp. *angustifolium*), leaves (5)-20-(40) mm wide and (60)-110-(220) mm long ((3)-10-30) mm wide and (35)-85-(170) mm long in subsp. *angustifolium*).—[D.H.K.]

262. CALLITRICHE. Schotsman, H. D., 1966, Note sur Callitriche fassettii Schotsm., nov. spec., *Acta bot. neerl.*, **15,** 477-483. In connection with preliminary studies on the *Callitriche hermaphroditica* complex a new species—*C. fassettii*, from the Pacific coast of North America, is described and figured. Previously confused with *C. hermaphroditica*, *C. fassettii* is known at present from Oregon and California.—[D.H.K.]

262. CALLITRICHE. Pedersen, A., 1966, Callitriche platycarpa i Danmark, *Bot. tidsskr.*, **61**, 298-303. Based upon a paper by Schotsman (1954) differential diagnoses of the tetraploid *Callitriche platycarpa* and the diploid *C. stagnalis* are given, stressing leaf and fruit characters. The modifications of *C. platycarpa* are discussed, and the importance of fruit characters in the taxonomy of *Callitriche* is pointed out. A list of the Danish finds of *C. platycarpa* is given.—[Author's summary]

269.→ UMBELLIFERAE. Bell, C. R. & Constance, L., 1966, Chromosome numbers in Umbelliferae, 3, *Am. J. Bot.*, **53**, 512-520. Chromosome numbers, mostly made on American material, are reported for 100 taxa to the Umbelliferae.—[D.H.K.]

269.→ UMBELLIFERAE. Cerceau-Larrival, M. T., 1966, Involucre et involucelle chez les Ombellifères, *Bull. Soc. bot. Fr.*, **112,** 255-267. In the Umbelliferae, the bracts correspond to entire, sessile leaves consisting only of a blade or to sheaths of old bracts (the terminal limb having disappeared) or to palmatisect, sessile leaves.—[Author's summary, translated by E.B.B.]

269.→ UMBELLIFERAE. Crackles, E., 1966, Three Umbellifers at the northern edge of their range, *Naturalist*, **1966,** 49-51. Notes on *Sison amomum*, *Bupleurum tenuissimum* and *Petroselinum segetum* in the East Riding of Yorkshire.—[D.H.K.]

283/2. BUPLEURUM ROTUNDIFOLIUM L. Mackechnie, R., 1966, Thorow-wax (Bupleurum rotundifolium) at Milngavie, *Glasg. Nat.*, **18,** 451. The occurrence of this very rare species as a garden weed at Milngavie, Stirlingshire, in 1964 is reported. The record is the first for the Clyde Valley.—[D.H.K.]

318/2. MERCURIALIS ANNUA L. Conacher, E. R. T., 1966, Annual Mercury (Mercurialis annua) in Renfrewshire, *Glasg. Nat.*, **18,** 45. *Mercurialis annua*, a common lowland weed in parts of southern England, is recorded from a slightly-heated greenhouse at Bridge of Weir, Renfrewshire. Rarely encountered in Scotland it is believed to have been imported as a seed in soil with Geraniums purchased from a Chichester (Sussex) Nursery.—[D.H.K.]

320/12. POLYGONUM HYDROPIPER L. Timson, J., 1966, Polygonum hydropiper L. (Biological Flora), *J. Ecol.*, **54,** 815-821.

325. RUMEX. Cavers, P. B. & Harper, J. L., 1966, Germination polymorphism in Rumex crispus and Rumex obtusifolius, *J. Ecol.*, **54,** 367-382. The light and temperature requirements for germination of seeds of *Rumex obtusifolius* and the maritime and inland forms of *R. crispus* have been tested. Differences in germination response between seeds from different species have been observed as have differences between seeds of the same species but from different habitats, seeds from different plants (of the same species) in the same habitat, and seeds from different positions in the same plant. In particular, great differences in germination

behaviour were found between seeds from different plants in the same habitat. The survival value of germination polymorphism is stressed.—[Authors' summary]

334. PLATANUS. Depape, G. & Brice, D., 1966, Platanes actuels et Platanes fossiles, *Rev. gén. Bot.*, **73,** 41-84. A study of the distribution of present species of *Platanus* and of fossil representations of the genus, pointing out the difficulties of confirming the origin and subsequent dispersal of this group and its place in systematic classification.—[E.B.B.]

335. BETULA. Dugle, J. R., 1966, A taxonomic study of western Canadian species in the genus Betula, *Can. J. Bot.*, **44,** 929-1007.

335/3. BETULA NANA L. Hutchinson, T., 1966, The occurrence of living and sub-fossil remains of Betula nana L. in Upper Teesdale, *New Phytol.*, **65,** 351-357. The author reports the discovery, in May 1965, of a small colony of *Betula nana* in a blanket bog in Upper Teesdale. This is the first certain occurrence of this species in England in historical times, the nearest known locality being *c.* 130 miles away in Perthshire, Scotland. A list of associated species is given and comparisons are made between the Teesdale population and three Scottish populations.

The history of *B. nana* in Britain is discussed and details provided of remains of the species found in the peat of Upper Teesdale. The Late-glacial finding of the species in Lower Teesdale suggests that the present colony may have a continuity in Upper Teesdale from Late-glacial times to the present day (approx. 12,000 years).—[D.H.K.]

337/1. CARPINUS BETULUS L. Shelyag-Sosenko, Y. R., 1966, Occurrence and east boundary of the European Hornbeam (Carpinus betulus L.), *Ukr. bot. Zh.*, **23,** 75-81.

339. FAGUS. Lamprecht, H., 1966, Die beiden Fagus sylvatica—Exmutanten laciniata und asplenifolia und ihre genetische Grandlage, *Phyton*, **11,** 189-198. Genetical studies on aberrant leaf forms of *Fagus sylvatica*.—[D.H.K.]

357/1. ERICA TETRALIX L. Bannister, P., 1966, Erica tetralix L. (Biological Flora), *J. Ecol.*, **54,** 795-813.

370/1. LYSIMACHIA NEMORUM L. Hendrych, R., 1966, Zur Verbreitung der Lysimachia nemorum L. in der Slowakei, *Folia Geobot. Phyto-Taxonom. Bohem.*, **1,** 145-153. Studies on the distribution of *Lysimachia nemorum* in Czechoslovakia.—[D.H.K.]

376/1. FRAXINUS EXCELSIOR L.—See 173/1. ACER PSEUDOPLATANUS.

384/2. GENTIANA VERNA L. Lamb, J. G. D., 1966, The occurrence of Gentiana verna L. on different soil types in Co. Clare, *Ir. Nat. J.*, **15,** 187-191. Near Ballyvaughan in the Burren district of Co. Clare, Irish Republic, *Gentiana verna* grows on three distinct types of soil. The significance of this is reviewed and discussed.—[D.H.K.]

386/1. MENYANTHES TRIFOLIATA L. Hadăč, E. & Richterová, H., 1966, Die Verbreitung von Menyanthes trifoliata L. in der Tschechoslowakei, *Folia Geobot. Phyto-Taxonom. Bohem.*, **1,** 129-144. The distribution of *Menyanthes trifoliata* in Czechoslovakia is outlined and various aspects, such as the causes of the absence of the species in various parts of the Carpathians, are discussed.—[D.H.K.]

392. SYMPHYTUM. Sandford, H. A., 1966, The distribution of the Comfreys in Essex, *Essex Nat.*, **31,** 288-293.

403/A. ALKANNA. Rechinger, K. H., 1965, Zur Kenntnis der europäischen Arten der Gattung Alkanna, *Annln. naturh. Mus. Wien*, **68,** 191-220. A revision of the European species of *Alkanna*.—[D.H.K.]

406. CALYSTEGIA. Bangerter, E. B., 1966, A survey of Calystegia in the London Area: fourth progress report, 1965, *Lond. Nat.*, **45,** 122-124. An account of the fourth year's work on a statistical analysis of populations of the *Calystegia sepium-silvatica* complex in the London area.—[D.H.K.]

413/1. SOLANUM DULCAMARA L. Morton, J. D., 1966, Woody nightshade (Solanum dulcamara) with white flowers, *Glasg. Nat.*, **18,** 452. *Solanum dulcamara* with white flowers, instead of the usual purple, is recorded from two localities in the Glasgow area.—[D.H.K.]

415/C. CAPSICUM. Terpo, A., 1966, Kritische Revision der Wildwachsenden Arten und der Kultivierten Sorten der Gattung der Gattung Capsicum, *Feddes Rep.*, **72,** 155-191.

425. MIMULUS. Vickery, R. K. Jr., Speciation and isolation in section Simiolus of the genus Mimulus, *Taxon*, **15,** 55-63. The genus *Mimulus* section *Simiolus* comprises four major species complexes (1) The *Mimulus guttatus* complex of western North America containing *M. guttatus* Fischer, $n = 14$, 15, 16 and 28; *M. glaucescens* Greene, *M. laciniatus* Gray, *M. lyratus* Benth., all with $n = 14$; *M. nasutus* Greene, $n = 13$ and 14; *M. platycalyx* Pennell, $n = 15$ and *M. dentilobus*, $n = 16$. (2) The *Mimulus tilingii* complex of alpine western North America containing *M. tilingii* Regel with $n = 14$, 15, 24 and 28, and a species as yet undescribed with $n = 16$. (3) The *Mimulus luteus* complex of western South America containing *M. luteus* L., $n = 30$, 31 and 32, *M. tigrinus* hort., $n = 30$ and 32, and *M. cupreus* Dombrain, $n = 31$. (4) The *Mimulus glabratus* complex of western North and South America containing *M. glabratus* Kunth and its varieties, $n = 1$, 14, 15, 30, 31, 45 and 46, and *M. pilosiusculus* Kunth, $n = 46$. The genetics, taxonomy and evolution of these complexes are discussed and commented upon.—[D.H.K.]

429. DIGITALIS. Werner, K., Die Wuchsformen der Gattungen Isoplexis (Lindl.) Benth. und Digitalis L., *Bot. Jb.*, **85,** 88-149. Studies in growth form of all the species of *Isoplexis* and *Digitalis*. These are described and classified into eight growth types.—[D.H.K.]

435. EUPHRASIA. Bobear, J., 1966, Variation in the Irish Euphrasia, *Am. J. Bot.*, **53,** 631. The taxonomic treatment of Irish *Euphrasia* species has followed the pattern designated as critical. Intermediate populations are of frequent occurrence. Populations selected as representative of homogenous morphological types were subjected to simple biometric analysis of 35 morphological characters. All characters, except one, glandular hairs were found to be continuously variable within each species. Some vegetative characters proved efficient in distinguishing species and the majority of characters proved to be stable in cultivation.—[D.H.K.]

440. OROBANCHE. Gilli, A., 1966, Neue Fundorte von Orobanchaceen aus dem Mediterrangebiet, *Öst. bot. Z.*, **113,** 211-216. Notes on new localities for various *Orobanche* species in southern France, Italy, Greece, Jugoslavia, Bulgaria, Spain, Morocco and Turkey. *O. rechingeri* Gilli, sp. nov., is described from Greece.—[D.H.K.]

441. PINGUICULA. Casper, S. J., 1966, Monographie der Gattung Pinguicula L., *Bibl. Bot.*, **127/128,** 1-209 + Taf. 1-16. A revision of *Pinguicula* with full descriptions, keys, distribution maps and illustrations of the various species.—[D.H.K.]

441/1. PINGUICULA LUSITANICA L. Slack, A. A. P., 1966, On the distribution in Britain of Pinguicula lusitanica, *Glasg. Nat.*, **18,** 438-444. The distribution of *Pinguicula lusitanica* in Britain is described and the influence of summer temperature, winter cold, and humidity, disturbance of soil, type of rock formation, nearness of mountains, etc., is discussed. The chief associates of the species are noted and their influence reviewed .Two areas of distribution are recognised in Scotland, a 'main' area and a 'fringe' area. In the 'fringe' area *P. lusitanica* appears to be restricted to 'sun-trap' localities.—[Author's summary.]

445.→ LABIATAE. Fabre, G. & Nicoli, R. M., 1966, Sur la morphologie des akènes de quelques Labiées de la flore de France. Intérêt systematique de cette étude, *Bull.*

Soc. bot. Fr., **112**, 267-275. Although there is a relative uniformity in the morphology of Labiate seeds, diversity exists sufficient to assist in the distinction of tribes, certain genera and certain species. In some genera such as *Teucrium*, *Scutellaria* and *Lamium* the seeds can be used to distinguish the species clearly. The seeds of 84 species are figured.—[E.B.B.]

445.— LABIATAE. Wojciechowska, B., 1966, Morfologia i anatomica owócow i nasion z rodziny Labiatae ze szezególnym uwzglednieniem gatunkow leczniczych, *Monographiae bot.*, **21**, 3-244. An extensive study of the morphology and anatomy of fruits and seeds in the Labiatae with particular respect to medicinal species.—(D.H.K.).

445/3. MENTHA ARVENSIS L. Suominen, J., 1966, Taxonomic studies on Mentha arvensis L. in Finland, *Annls. Bot. Fenn.*, **3**, 61-78. The chromosome number of Finnish *Mentha arvensis* is $2n = 72$. The material studied consisted of eleven strains from different parts of the country and from different habitats, these were subjected to extensive cultivation experiments.

Four infraspecific units were separated and these were found to be linked almost continuously with each other through numerous intermediates. These units have no taxonomic names or status as yet, but will probably be treated as varieties.—[D.H.K.]

448. THYMUS. Jalas, J. & Kaleva, K., 1966, Chromosome studies in Thymus L. (Labiatae), 4. Mitotic numbers in some Balkan, Transylvanian and south Alpine taxa, *Annls. Bot. Fenn.*, **3**, 123-127.

450. SATUREJA. Epling, C. & Játiva, C., 1966, A descriptive key to the species of Satureja indigenous to North America, *Brittonia*, **18**, 244-248.

455/g. SALVIA GLUTINOSA L. Robson, A. W., 1966, Salvia glutinosa L. in Perthshire, *Trans. Proc. Perthsh. Soc. nat. Sci.*, **11**, 24-28. A detailed account of the naturalisation of *Salvia glutinosa*, a native of south-east Europe, the Black Sea area, Caucasus and Persia, on an island in the river Tay near Capath Bridge. The species was introduced into Britain as a garden plant in 1759. Details of the ecology of the plant in its Scottish habitat are given, together with a list of associated species.—[D.H.K.]

457/1. PRUNELLA VULGARIS L. Andrew, P., 1966, Subspecies and ecological races in Prunella vulgaris (Labiatae), *Am. J. Bot.*, **53**, 636.

470/4. TEUCRIUM SCORODONIA L. Freson-Laskar, R., 1966, Essai biosystématique sur Teucrium scorodonia L. en Belgique, *Bull. Jard-bot. État. Brux.*, **36**, 297-312. In Belgium *Teucrium scorodonia* revealed a surprising diversity of habitats. Experiment shows that the species has no ecotypic differentiation but is able to colonise a great range of habitats because of its ecological tolerance in the mid-European area, although it shows a great genetic differentiation in the Mediterranean area.—[E.B.B.]

472. PLANTAGO. Bassett, I. J., 1966, Taxonomy of the North American Plantago L. section Micropsyllium Decne., *Can. J. Bot.*, **44**, 467-479.

472/3. PLANTAGO LANCEOLATA L. Matthews, J. M., 1966, Diurnal variation in the release of pollen by Plantago lanceolata, *Proc. Linn. Soc. N.S.W.*, **90**, 231-237. An air sampler was used to record the pollen release of *Plantago lanceolata*. The pollen catch indicates a tendency for pollen release to reach a major morning peak which is followed by a secondary peak two to four hours later.

Observations were also made on another exertion. Some of the observations indicate two main periods of anther exertion during the day.—[Author's summary.]

475. CAMPANULA. Hild, J., 1963, Experimentelle Sociologische Untersuchungen mit einigen Arten der Gattung Campanula, *Biol. Jaarb.*, **31**, 206-217.

475. CAMPANULA. Kovanda, M., 1966, Some chromosome counts in the Campanula rotundifolia complex, *Preslia*, **38**, 48-52. Chromosome numbers of three species

of the Czech *Campanula rotundifolia* complex were counted, viz. *C. rotundifolia* L., *C. polymorpha* (Witasek) Prain, *et al.* and *C. corcontica* Sowek. Of the nine samples of *C. rotundifolia* three were found to be tetraploid, ($2n = 68$), and five were diploids ($2n = 34$), in the remaining sample triploids ($2n = 51$) were encountered. *C. polymorpha* and *C. corcontica* were tetraploid with $2n = 68$.—[D.H.K.]

475/7. Campanula rotundifolia L. Shetler, G. S., 1966, Geographic variation of Campanula rotundifolia in North America, *Am. J. Bot.*, **53,** 639. In North America the *Campanula rotundifolia* complex consists of a polyploid series showing great morphological variation. Statistical studies on natural populations, and on 3,000 herbarium specimens have revealed the presence of four regional morphotypes which represent weakly differentiated geographic races of the single species *C. rotundifolia*. These races are being treated taxonomically as subspecies.—[D.H.K.]

502/3. Bidens frondosa L. Lhotská, M., 1966, Der älteste Fund der Art Bidens frondosa L. in Europa, *Folia Geobot. Phyto-Taxonom. Bohem.*, **1,** 186-189. The author draws attention to a record of the North American species *Bidens frondosa* as an adventive at Breslau, Germany in 1777, cited by Krocker in his *Flora Silesiaca* (1790), this predates by nearly 60 years the record of 1834 from Palermo, Sicily, which was previously considered to be the first record of the occurrence of *B. frondosa* in Europe.—[D.H.K.]

502/v. Bidens vulgata. Greene. Corillion, R., 1966, Une adventice nouvelle pour le Nord-Ouest de la France: Bidens vulgata Greene (Composées), *Bull. Soc. Scient. Bretagne*, **40,** 141-143. For the first time in the north-west of France, and for the third time only in that country the North American adventive *Bidens vulgata* was recorded from the sandy bed of the Loire in 1964. It is recorded from south-east England, and is allied to the long-established and wide-spread adventive *B. frondosa* from which it differs mainly in the characters of the achene as follows.

	B. frondosa	*B. vulgata*
Outer bracts of capitulum:	(5)-6-8-(10)	(9)-10-16-(19)
Number of achenes per capitulum:	*c.* 50	*c.* 60-140
Achenes:	rather narrow (7 × 2·7 mm), brownish-black, rarely green, dull brownish at apex ± regularly ciliate-pectinate.	rather broad (7·5-9 × 3·7-5 mm.), yellowish-brown or olive, not regularly ciliate-pectinate at apex.
Surface of achenes:	covered with small papillae, very rarely without papillae (see outer ripe achene first), hispid or pubescent, with whitish or reddish hairs, variable in number, from (0·1)-0·2-0·4-(0·6) mm long.	with very few scattered papillae or without, glabrous or scarcely and shortly hispid, with hairs 0·1 (0·3) mm long, some short hairs spinulose on the median nerves.
Margin of achenes:	with spines all pointing upwards.	With erect spines on the upper three-quarters; reflexed spines on the lower quarter (sometimes with reflexed spines only at the apex).

—[E.B.B.]

503. Galinsoga. Gusev, U. D., 1966, The dispersal of species of Galinsoga in the Leningrad region, *Bot. Zh. SSSR.*, **51**, 577-578. Notes on *Galinsoga parviflora* and *G. ciliata* in the Leningrad region.—[D.H.K.]

504. Ambrosia. McClintock, D., 1966, A ragweed (Ambrosia psilostachya DC.) established in Scotland, *Glasg. Nat.*, **18**, 452-453. The North American species *Ambrosia psilostachya* is recorded as an established adventive on dunes at Seafield (Low Green), south of Ayr, where it has been confused with *A. artemisiifolia.* The differences between *A. psilostachya* and *A. artemisiifolia* are given. Elsewhere in Britain *A. psilostachya* is established on dunes in various places on the west Lancashire coast and on Boughton Gifford Common, Wiltshire.—[D.H.K.]

504/1. Ambrosia artemisiifolia L. Touraine, R., Cornillon, J. & de Poumeyrol, B., 1966, Pollinese et Ambrosia. La diffusion actuelle d'Ambrosia dans le région lyonnaise, son role dans les maladies par allergie pollinique, *Bull. Soc. Linn. Lyon*, **35**, 279-285. Information on the history, ecology and distribution of *Ambrosia artemisiifolia* is given in this paper, which is mainly concerned with the part played by the pollen in causing hay-fever.—[E.B.B.]

506. Senecio. Crawford, R. M. M., 1966, The control of anaerobic respiration as a determining factor in the distribution of the genus Senecio, *J. Ecol.*, **54**, 403-413.

506. Senecio. Drury, D. G. & Watson, L., 1966, A bizarre pappus form in Senecio, *Taxon*, **15**, 309-311. Examination of the pappus in many genera of the Compositae has revealed many previously undescribed variations, one of the most unusual of these is to be found in *Senecio*. In some species of this very large genus the pappus of individual achenes fall into two distinct morphological characters. In these, the majority of the hairs constituting the two irregular pappus whorls are of the ordinary type; but restricted to one region on the outer whorl are 5-10 hairs of a very different and characteristic form. The latter, the authors term *fluked* hairs. The anatomy of the two hair types are described in detail, and a table differentiates their characters; they are also illustrated by line drawings. Of the 245 species of *Senecio* examined, fluked pappus hairs have been noted in only 40, these include *S. squalidus*, *S. sylvaticus*, *S. vernalis* Waldst. & Kit., *S. viscosus* and *S. vulgaris*. The taxonomic implications of the two hair types are being investigated.—[D.H.K.]

506/4. Senecio squalidus L. Kent, D. H., 1966, Senecio squalidus L. in the British Isles—8. The recent spread in Scotland, *Glasg. Nat.*, **18**, 407-408. An account of the historical spread of the south European species *Senecio squalidus* in Scotland.—[D.H.K.]

506/4. Senecio squalidus L. Mackechnie, R., 1966, New records of Oxford Ragwort (Senecio squalidus), *Glasg. Nat.*, **18**, 453. Gives details of new Scottish localities for *Senecio squalidus* near Glasgow and Edinburgh.—[D.H.K.]

508/1. Tussilago farfara.—See 254. Epilobium.

511. Calendula. Meusel, H. & Ohle, H., 1966, Zur Taxonomie und Cytologie der Gattung Calendula, *Öst. bot. Z.*, **113**, 191-210.

533/2. Chrysanthemum leucanthemum L. Favarger, C. & Villard, M., 1966, Nouvelles recherches cytotaxonomiques sur Chrysanthemum leucanthemum L. *sens. lat.*, *Ber. schweiz. bot. Ges.*, **75**, 57-79. Further cytotaxomical studies on the *Chrysanthemum leucanthemum* complex in Europe.—[D.H.K.]

540. Cirsium. Moore, R. J. & Frankton, C., 1966, Cytotaxonomic studies in North American Cirsium, *Am. J. Bot.*, **53**, 635.—[D.H.K.]

542. Onopordum. Dress, W. J., 1966, Notes on the cultivated Compositae, 9. Onopordum, *Baileya*, **14**, 75-86. Describes and keys 13 species of *Onopordum* known to be in cultivation, a number of photographs and drawings illustrate the account.—[D.H.K.]

544. CENTAUREA. Saarisalo-Taubert, A., 1966, A study of hybridization in Centaurea, section Jacea, in Eastern Fennoscandia, *Annls. Bot. Fenn.*, **3**, 86-95. Studies on introgression between *Centaurea jacea* and *C. nigra* in Finland by means of herbarium material and statistical studies on 32 natural populations. It was found that even the earliest gatherings of *C. nigra* from old ballast workings, comprise beside pure *C. nigra*, plants of *C. nigra* with some genes of *C. jacea* or the hybrid *C. jacea* × *nigra*. At the present time pure *C. nigra* has disappeared and has been replaced by a fertile hybrid complex.—[D.H.K.]

549. HYPOCHOERIS. Shinners, L. H., 1966, Hypochoeris microcephala var. albiflora (Compositae) in south-eastern Texas: new to North America, *Sida*, **2**, 393-394. In reporting the discovery in Texas of *Hypochoeris microcephala* var. *albiflora* an adventive from South America new to the United States the author reviews and gives a key to the four adventive species of *Hypochoeris* found in the U.S.A., these include *H. radicata* and *H. glabra* from Europe and *H. tweedii* (Hook. & Arn.) Cabrera from South America.—[D.H.K.]

559. CREPIS. Van Ooststroom, S. J. & Reichgelt, T. J., 1966, Over het verschijnen van Crepis sancta (L.) Babc. in Nederland, *Gorteria*, **3**, 13-16. *Crepis sancta* (L.) Babcock, a native of the Mediterranean region, was first reported as an established adventive near Nîmes, France, in 1763, since that time it has spread widely in France, Belgium, Luxembourg and the Netherlands. The authors review the historical spread of the species in Europe in view of recent discoveries of the plant in two new localities in the southern part of the Netherlands province of Limburg. The species is described and illustrated by a line drawing. It seems likely that *C. sancta* will eventually spread to the British Isles if it is not already present.—[D.H.K.]

560. TARAXACUM. Van Soest, J. L., 1966, Korte determinatietabel voor de Nederlandse soorten van Taraxacum sect. Erythrospermum Dahlst. em. Lindb.f., *Gorteria*, **3**, 43-47. A key is provided to the identification of the Dutch species of *Taraxacum* sect. *Erythrospermum*. Illustrations of the leaves of all the species are also given.—[D.H.K.]

560/G. GUIZOTIA ABYSSINICA (L.f.) Cass. Jovet, P., 1966, Guizotia abyssinica (L.) Cass. dans la banlieue de Paris Composée, *Cah. Nat.*, **22**, 9-11. First found at Fontainebleau in 1953, *Guizotia abyssinica* is now recorded (1965) in a Paris suburb. A description of the habitat is given as well as of the plant, which is illustrated by a figure, including details of floret, achene and bracts.—[E.B.B.]

560/S. SIGESBECKIA. Henker, H., 1965, Die Gattung Sigesbeckia L. in Europa unter besonderer Berücksichtigung von Deutschland, *Arch. Freunde NatGesch. Mecklenb.*, **11**, 7-54. A revision of the adventive species of *Sigesbeckia* found in Europe, particularly in Germany, mostly occurring as introductions with 'shoddy' or grain, though *S. orientalis* was cultivated as a medicinal plant and is found as an established escape.

The author recognises three species, *S. orientalis* L., *sensu lato*, widespread in Asia, etc., *S. cordifolia* Humb., Barth & Kunth. from Australia and *S. microcephala* DC. from South America. Descriptions are provided of the three species, and all known European exsiccatae cited. *S. cordifolia* is an established garden weed at Formby, S. Lancs., while the other two species have occurred as ephemerals.—[D.H.K.] See also p. 19 of this issue of *Proc. bot. Soc. Br. Isl.*—**Ed.**

563/1. ALISMA PLANTAGO-AQUATICA L. Morton, J. D., 1966, Water Plantain (Alisma plantago-aquatica): opening of flowers, *Glasg. Nat.*, **18**, 454. Observations made on *Alisma plantago-aquatica* showed that the flowers remained open, sunshine or not, from about 9.30 a.m. till dusk.—[D.H.K.]

571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. Ferro, G., 1966, Il numero cromosomico somatico di Lagarosyphon major (Ridley) Moss, *Atti Ist. bot. Univ. Lab. crittogam.*

Pavia., ser. 6, **1**, 111-115. The South African species *Lagarosiphon major* has been found naturalised in pools near Pavia, Italy. Cytological examination of the plant showed its chromosome number to be $2n = 22$.—[D.H.K.]

576. ZOSTERA. McMillan, N. F., 1966, Zostera spp. in Belfast Lough, *Ir. Nat. J.*, **15**, 243.

577/4. POTAMOGETON NODOSUS Poir. Van der Ploeg, D. T. E., 1966, Potamogeton nodosus Poir. in Friesland, *Gorteria*, **3**, 74-75. *Potamogeton nodosus* has recently been discovered in the province of Friesland, Holland. It is new to the area.—[D.H.K.]

577/14. POTAMOGETON OBTUSIFOLIUS Mert. & Koch. Booth, E. M. & Scannell, M. J. P., 1966, Potamogeton obtusifolius Mert. & Koch in Co. Wicklow, *Ir. Nat. J.*, **15**, 243.

590. MAIANTHEMUM. Ingram, J., 1964, Notes on the cultivated Liliaceae, 3, Maianthemum, *Baileya*, **14**, 50-59. Three species of *Maianthemum* are known to be in cultivation—*M. canadense* Desf., *M. bifolium* (L.) F. W. Schmidt and *M. kamtschaticum* (Chamisso) Nakai, these are described and illustrated, and a key provided to their identification.—[D.H.K.]

594/1. FRITILLARIA MELEAGRIS L. Willis, J. C. N., et al, 1966, Fritillaria meleagris, *Trans. Suffolk Nat. Soc.*, **13**, 214-217. Notes on the history, origin, name and status of *Fritillaria meleagris* in Britain, with particular emphasis on its distribution in Suffolk.—[D.H.K.]

605. JUNCUS. Edgar, E., 1964, The leafless species of Juncus in New Zealand, *N.Z. Jl Bot.*, **2**, 177-204. A revision of the leafless species of *Juncus* in New Zealand. Ten indigenous species are recognised, while *J. effusus*, *J. subuliflorus* Drej. (*J. conglomeratus* auct.), *J. inflexus* and *J. subsecundus* Waterfield occur as established introductions.—[D.H.K.]

605/1. JUNCUS SQUARROSUS L. Welch, D., 1966, The reproductive capacity of Juncus squarrosus, *New Phytol.*, **65**, 77-86.

605/1. JUNCUS SQUARROSUS L. Welch, D., 1966, Juncus squarrosus L. (Biological Flora), *J. Ecol.*, **54**, 535-548.

605/16. JUNCUS CAPITATUS Weigel. Kral, R., 1966, Juncus capitatus Weigel (Juncaceae) in Louisiana: new to the United States, *Sida*, **2**, 390-392. The European species *Juncus capitatus* was found growing in considerable abundance, with *J. bufonius*, on the sandy shoulders of the highway between Monroe and Ruston, Louisana, in 1964. A description and illustration of the plant, which is new to North America, is provided.—[D.H.K.]

605/19. JUNCUS ARTICULATUS L. Hämet-Ahti, L., 1966, Some races of Juncus articulatus L. in Finland, *Acta bot. fenn.*, **72**, 4-22. In Finland there are at least three varieties of *Juncus articulatus* L. emend. Lagerst. & Krok, viz. var. *articulatus sens. lat.*, var. *lindhardii* (Wiinst.) Wiinst and var. *hylanderi* Hämet-Ahti, var. nov. *J. alpinus* × *articulatus* is also substantiated as occurring in Finland.—[D.H.K.]

605/20. JUNCUS ALPINOARTICULATUS Chaix. Reichgelt, T. J., 1966, Een merkwaardige vindplaats van Juncus alpinoarticulatus subsp. atricapillus (Drejer ex Lange) Reichg., *Gorteria*, **3**, 47-48. The two subspecies of *Juncus alpinoarticulatus* Chaix ex Vill. found in the Netherlands, viz. subsp. *atricapillus* (Drejer ex Lange) Reichg. and subsp. *arthrophyllus* (Brenner) Reichg. are restricted there to two distinctly separate areas. The former subspecies occurs only near the coast, in the dunes, the latter far inland near the eastern border of the country. In 1962 the coastal subspecies was found on the border of a pond near Wijchen, i.e. within the area of the inland one. Recently an acceptable explanation of the curious occurrence was found. Near the said pond several species from other parts of the country were planted, e.g. *Parnassia* from the dunes, and it seems probable that seeds of the *Juncus* have come there in this way.—[Author's summary.]

606. LUZULA. Edgar, E., 1966, Luzula in New Zealand, *N.Z. Jl. Bot.*, **4**, 159-184. A revision of *Luzula* in New Zealand. Eleven indigenous species are recognised. In addition *L. campestris*, *L. multiflora* and *L. congesta* have been introduced from Eurasia.—[D.H.K.]

606. LUZULA. Nordenskiold, H., 1966, Cytogenetic studies in the genus Luzula in New Zealand, *N.Z. Jl Bot.*, **4**, 185-195.

615. SISYRINCHIUM. Böcher, T. W., 1966, Experimental and cytological studies on plant species, 10. Sisyrinchium, with special reference to the Greenland representative, *Bot. tidsskr.*, **61**, 273-278. Species of *Sisyrinchium* are investigated cytologically and some North American high polyploid taxa ($2n = 96$), are compared with the Greenland representative of the genus. The latter being a tetraploid ($2n = 32$), is described as a new species, *S. groenlandicum*. The North American *S. montanum* forms a polyploid complex within which it is proposed to raise Fernald's var. *crebrum* to subspecific rank. *S. groenlandicum* shows affinities to west North American mountain plants and is regarded as a native. Greenland species immigrated long ago, possibly in the Late-glacial period.

Some new chromosome numbers are reported and the morphology of the mitotic chromosomes is discussed.—[Author's summary.]

615. SISYRINCHIUM. Fredskild, B., 1966, To nye fund af Sisyrinchium på Grønland, *Bot. tidsskr.*, **61**, 291-294. The distribution of *Sisyrinchium* in Greenland is discussed, and details of associated species given. Information on two new localities is provided, making six known stations in the country.—[D.H.K.]

624.→ ORCHIDACEAE. Vermeulen, P., 1966, The system of the Orchidales, *Acta bot. neerl.*, **15**, 224-253.

624.→ ORCHIDACEAE. Wildhaber, O. J., 1966, Zwei neue Orchideenbastarden, *Ber. schweiz. bot. Ges.*, **75**, 293-296. Two new hybrids in the Orchidaceae—*Orchis mascula* × *militaris* and *Anacamptis pyramidalis* × *Gymnadenia odorotissima* are described from Switzerland. The occurrence of × *Anacamptorchis loniceae* Braun-Blanquet (*Anacamptis pyramidalis* × *Orchis morio*) in Switzerland is also recorded. The hybrid is new to the Swiss flora.—[D.H.K.]

625. EPIPACTIS. Meili-Frei, E., 1966, Cytogenetik und Cytotaxonomie einheimischer Arten von Epipactis, Listera, Neottia (Orchidaceae), *Ber. schweiz. bot. Ges.*, **75**, 219-292 + 16 plates.

625/2, EPIPACTIS HELLEBORINE (L.) Crantz. Doyon, D. & Cayouette, R., 1966, Epipactis helleborine (L.) Crantz au Québec, *Naturaliste can.*, **93**, 171-176. *Epipactis helleborine* is an orchid introduced from Europe. In Quebec its range is quite similar to those of several species found in rich maple woods described by Dansereau in 1959, such as *Hepatica acutiloba*, *Dicentra canadensis*, *Phryma leptostachya*. Facts reported indicate that the north-eastern limit of *E. helleborine* is much the same as it was established by Marie-Victorin and Meilleux in 1940.—[Authors' summary].

627. SPIRANTHES. Andreas, C. H., 1966, Spiranthes cernua (L.) Rich., *Gorteria*, **3**, 31-32. Notes on the increase and spread in the Botanical Garden at Haren, province Groningen, Netherlands, of *Spiranthes cernua*, a North American species which first occurred there spontaneously in 1961.—[D.H.K.]

628. LISTERA. See 625. EPIPACTIS.

629. NEOTTIA. See 625. EPIPACTIS.

640. OPHRYS. Metron, J., 1966, Sur deux Orchidées, *Bull. Ass. Nat. Vall. Loing.*, **42**, 13. *Ophrys mangini* Tallon first discovered at Scrques, France in 1959 has been

found near Bouray sur Juine. The question of its systematic position, either a hybrid between *O. apifera* and *O. sphegodes* or a variety of *O. apifera* remains unsolved.—[D.H.K.]

649/2. Arum italicum Mill. McAllister, H. A., 1966, Garden (Large) Cuckoo-pint (Arum italicum) in Ayrshire, *Glasg. Nat.*, **18,** 454. *Arum italicum*, a European species, is recorded from a roadside bank in Ayrshire, Scotland.—[D.H.K.]

650/3. Lemna minor. L. Anon, 1966, Duckweed as an aid to space travellers, *Nurs. Mirror*, **121,** 592. The growth rate and characteristics of 5 species of the Lemnaceae was studied experimentally at Stanford Research Institute, California, on behalf of the U.S. Office of Naval Research. The purpose of these experiments was to find the most efficient plant to supply a regenerative system of continuous production of oxygen and removal of carbon dioxide from the atmosphere of space ships and nuclear submarines. *Lemna minor* was found to be the most efficient of the species studied.—[D.H.K.]

654/4. Eriophorum vaginatum L.—See 667/1. Molinia caerulea (L.) Moench.

656. Eleocharis. Strandhede, S.-O., 1965, Chromosome studies in Eleocharis subser. palustres, 3. Observations on western European taxa, *Op. bot. Soc. bot. Lund.*, **9,** (2). Pp. 86.

663. Carex. Smith, D. L., 1966, Development of the inflorescence in Carex, *Ann. Bot.*, **30,** 475-486.

663/55. Carex appropinquata Schumach. Seddon, B. & Davis, T. A. W., 1966, Carex appropinquata in Pembrokeshire, *Nature Wales*, **10,** 43-44.

663/57. Carex otrubae Podp. de Langhe, J. E. & Duvigneaud, J., 1966, L'ecologie de Carex otrubae Podp. var. subcontigua (Kükenth) de Langhe et J. Duvign., comb. nov., *Bull. Jard.-bot. État Brux.*, **36,** 281-286. The authors state that *Carex otrubae* Podp. var. *subcontigua* (Kükenth) de Langhe & J. Duvign., comb. nov. is identical with *C. vulpina* L. var. *subcontigua* Kükenth; it is distinguished from the common plant by its slender habit, narrow leaves and short, compact inflorescence. A detailed description is given, with notes on distribution and ecology. Material of the variety from France, Germany, Belgium and Spain has been seen.—[E.B.B. & D.H.K.]

663/61. Carex arenaria L. Slack, A. A. P., 1966, Sand sedge (Carex arenaria) in an inland station, *Glasg. Nat.*, **18,** 454-455. *Carex arenaria*, usually a maritime species, though known from a number of inland localities in England, is recorded from Glen Fruin, Dunbarton. The new locality is about 3 miles from the sea as the crow flies, and is thought to be the most inland locality in which the plant grows in Scotland.—[D.H.K.]

664.→ Gramineae. Tzvelev, N. N., 1966, On the Ecologo-Geographical races within the family Gramineae and on their taxonomic rank, *Bot. Zh. SSSR*, **51,** 1099-1108.

664.→ Gramineae. Woolhouse, H. W., 1966, Comparative physiological studies on Deschampsia flexuosa, Holcus mollis, Arrhenatherum elatius and Koeleria gracilis in relation to growth on calcareous soils, *New Phytol.*, **65,** 22-31.

664.→ Gramineae. Woolhouse, H. W., 1966, The effect of bicarbonate on the uptake of iron in four related grasses, *New Phytol.*, **65,** 372-375. Studies on the effect of bicarbonate on the uptake of iron in *Deschampsia flexuosa*, *Holcus mollis*, *Arrhenatherum elatius* and *Koeleria cristata*.—[D.H.K.]

667. Molinia. Jirásek, V., 1966, Über die Systematische Einordnung der Gattung Molinia Schrank (Poaceae), *Preslia*, **38,** 23-25.

667/1. Molinia caerulea (L.) Moench. Gore, A. J. P. & Urquhart, C., 1966, The effect of waterlogging on the growth of Molinia caerulea and Eriophorum vaginatum, *J. Ecol.*, **54,** 617-633.

669/4. Glyceria maxima (Hartm.) Holmberg. Westlake, D. F., 1966, The biomass and productivity of Glyceria maxima, 1. Seasonal changes in biomass, *J. Ecol.*, **54,** 745-753.

670. Festuca.—See 671. Lolium.

670/2. Festuca arundinacea Schreb. Hertzsch, W. & Nitzsche, W., 1966, Chromosomenreduktion in den Nachkommenschaften von autopolyploidem Rohrschwingel (Festuca arundinacea Schreb.), *Zuchter*, **36,** 240-242. Data is provided on an experimentally produced autopolyploid form of *Festuca arundinacea.*—[D.H.K.]

670/2. Festuca arundinacea Schreb. Malik, C. P. & Thomas, P. T., 1966, Chromosomal polymorphism in Festuca arundinacea, *Chromosoma*, **18,** 1-18. *Festuca arundinacea* is a polymorphic species and experimental studies were carried out at the Welsh Plant Breeding Station, Aberystwyth, by crossing material from Spain, Portugal, Morocco, Tunisia, Algeria and Israel with an indigenous bred form. The hybrids obtained are described and grouped into fertile, partly fertile and sterile categories.—[D.H.K.]

670/4. Festuca altissima All. Todd, E. C. D., 1966, Wood fescue (Festuca altissima) in Lanarkshire, *Glasg. Nat.*, **18,** 455-456. Reports the occurrence of *Festuca altissima* in two localities in Lanarkshire, and reviews the Scottish records of this rare grass.—[D.H.K.]

670/6. Festuca rubra L. Davies, H. J. Alban, 1966, An account of some observations on Festuca rubra, the creeping Fescue, *Rep. Rugby Sc. nat. Hist. Soc.*, **99,** 14-15. Population studies on three colonies of *Festuca rubra* growing in (1) a coastal sand dune (2) a salt marsh and (3) ungrazed pastureland all within a short distance of each other on the coast of Cardigan, Wales.—[D.H.K.]

670/8. Festuca ovina L. Bidault, M., 1966, Etude biosystématique du Festuca ovina L. subsp. eu-ovina Hack. var. glauca Hack. subvar. macrophylla St.-Yves, *Bull. Soc. bot. Fr.*, **112,** 239-254. The morphological, caryological, geographical and phytosociological study of plants referred to *Festuca ovina* L. subsp. *eu-ovina* Hack. var. *glauca* Hack. subvar. *macrophylla* St.-Yves shows that this taxon is very distinct. An addition is made to the diagnosis of St.-Yves. Examination of meiosis reveals several interesting peculiarities, notably the existence of supernumary chromosomes in certain populations.—[Author's summary, translated by E.B.B.]

670/8. Festuca ovina L. Natkevičzaite-Ivanauskiene, M., 1966, On some microspecies of Festuca ovina L. emend. Hackel in Lithuania. *Bot. Zh., SSSR*, **51,** 740-744.

671. Lolium. Malik, C. P. & Thomas, P. T., 1966, Karyotypic studies in some Lolium and Festuca species, *Caryologia*, **19,** 167-196. Karyological studies on a number of species of *Lolium* and *Festuca*, including *Lolium temulentum*, *L. multiflorum*, *L. pratense*, *L. perenne*, *Festuca pratensis*, *F. arundinacea*, *F. altissima*. *F. ovina* and some of its subspecies, and *F. rubra*.—[D.H.K.]

671. Lolium. Terrell, E. E., 1966, A conspectus of the genus Lolium, *Am. J. Bot.*, **53,** 631. The genus *Lolium* consists of eight tentatively recognised species all of which are diploid ($2n = 14$). The genus is most closely related to *Festuca* with which it readily forms natural and artificial hybrids. The taxonomy of the genus is greatly obscured by the chaotic state of the nomenclature. There are nearly 450 names in existence for taxa of various rank, the results of the tendencies of many European botanists of the eighteenth and nineteenth centuries to apply a new name to every minor variant. The centre of variation of *Lolium* is in the Mediterranean area. —[D.H.K.]

671/1. LOLIUM PERENNE L. Wright, C. E., 1966, Differential reaction of Lolium perenne genotypes to certain herbicides, *Nature*, **210**, 327-328. Studies on the sensitivity of *Lolium perenne* genotypes of *Lolium perenne* to various herbicides carried out at the Plant Breeding Station, Loughgal, Northern Ireland.—[D.H.K.]

676/1. POA ANNUA L. Gibeault, V. A., 1966, Annual meadowgrass—a major weed of fine turf?, *J. Sports Turf Res. Inst.*, **41**, 48-52. The biology of *Poa annua* is discussed and methods of controlling it by various herbicides are reviewed.—[D.H.K.]

678. DACTYLIS. Carroll, C. P. & Borrill, M., 1965, Tetraploid hybrids from crosses between diploid and tetraploid Dactylis and their significance, *Genetica*, **36**, 65-82. Chromosome counts on the progeny of crosses between diploid and tetraploid races of *Dactylis* show that tetraploid hybrids are produced as well as the expected triploids. The relative proportion of 4x and 3x hybrids vary greatly in different crosses, and the data suggest that parental geno-type influence the result. Overall, the frequences of 3x and 4x hybrids are about equal, with no indication of a difference between the reciprocal 2x × 4x and 4x × 2x cross-combinations except perhaps in the case of the same subspecies. Rare triploid hybrids are found in crosses between diploid subspecies of *Dactylis*. The mechanisms by which a diploid plant could donate the two genomes to its offspring are discussed in relation to the *Dactylis* situation and the evolutionary significance of 4x hybrids formed in this way is considered.—[Authors' summary.]

678/1. DACTYLIS GLOMERATA L. Davidson, J. L. & Milthorpe, F. L., 1966, Leaf-growth in Dactylis glomerata following defoliation, *Ann. Bot.*, **30**, 173-184.

681. MELICA. Kujala, V. & Hämet-Ahti, L., 1966, Melica picta C. Koch found on the island of Verkhalahti, southern Finland, *Annls. Bot. Fenn.*, **3**, 96-99. The discovery of *Melica picta* C. Koch, a species native to mid and eastern Europe, growing in quantity on the Finnish island of Verkhalahti is reported. The species is described, and compared with *M. nutans* by means of a table. The status of *M. picta* in Finland is discussed, and it is considered that it was probably accidentally introduced by the activities of man.—[D.H.K.]

683. BROMUS. Seymour, F. C., 1966, Bromus mollis and its allies in New England, *Rhodora*, **68**, 169-174. Notes on *Bromus mollis*, *B. thominii*, *B. lepidus*, *B. secalinus*, *B. racemosus*, *B. commutatus*, *B. arvensis* L. and *B. brizaeformis* Fisch. & Mey. in New England, with a key to their identification.—[D.H.K.]

685. AGROPYRON. Bowden, W. M., 1966, *Citations of voucher specimens of the species and interspecific hybrids of the genus Agropyron in Canada and neighbouring areas*. Pp. 31. Plant Research Institute, Canada Dept. of Agriculture, Ottawa.

686/1. ELYMUS ARENARIUS L. Sigurbjòrnsson, B., 1963, Islenzki melurinn Ecotypur (staobrigei), *Náttúrfraedingurinn*, **33**, 123-137. Studies on ecotypes of *Elymus arenarius* growing on the coasts of Iceland.—[D.H.K.]

692/1. AVENA FATUA L. Bunting, J. D., 1966, Factors affecting the persistence of Avena fatua, *Canad. J. Pl. Sci.*, **4**, 469-478. Experimental studies on the germination of seeds and seedling development in *Avena fatua*.—[D.H.K.]

699/1. AMMOPHILA ARENARIA (L.) Link. Hope-Simpson, J. F. & Jefferies, R. L., 1966, Observations relating to vigour and debility in Marram Grass (Ammophila arenaria (L.) Link), *J. Ecol.*, **54**, 271-274.

700. CALAMAGROSTIS. Tzvelev, N., 1965, De genere Calamagrostis Adans, in U.R.S.S. notulae systematicae, *Novit. Syst. Plant. Vasc.*, **1965**, 5-50.

701. AGROSTIS. Clarkson, D. T., 1966, Aluminium tolerance within the genus Agrostis, *J. Ecol.*, **54**, 167-178.

TOPOGRAPHICAL

0, SARNIA: JERSEY. Le Sueur, F., 1966, Botanical report for 1965, *Soc. Jers. Ann. Bull.*, **19**, 108-111. Notes on some of the interesting plants seen in Jersey in 1965.—[D.H.K.]

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16, W. KENT, 17, SURREY, 18-19, ESSEX, 20, HERTS, 21, MIDDX. & 24, BUCKS. Lousley, J. E., 1966, Botanical records for 1965, *Lond. Nat.*, **45**, 17-21. Gives details of the more interesting plants found in the London Area during 1965.—[D.H.K.]

18-19, ESSEX. Jermyn, S. T., 1966, Botanical report for 1964, *Essex Nat.*, **31**, 300-308.

18-19, ESSEX. Sandford, H. A., 1966, The distribution of the Comfreys in Essex, *Essex Nat.*, **31**, 288-293. *Symphytum officinale*, *S. tuberosum*, *S.* × *uplandicum* and *S. orientale* are established in Essex but only *S. officinale* is native there. *S. asperum* Lepech. has been recorded once, presumably as a casual adventive. The distribution of the various taxa is discussed, and a simplified key provided to their identification.—[D.H.K.]

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29, CAMBRIDGE. Crompton, G., 1966, Thriplow Meadows grazing experiment, 5, *Nature Cambs.*, **9**, 21-22.

29, CAMBRIDGE. Perring, F. H., 1966, Vascular plant records for 1965, *Nature Cambs.*, **9**, 54. Includes a few new vice-county records.—[D.H.K.]

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37, Worcester. Kiernan, J. A., 1966, Notes on the flora of Worcestershire: Additions to the flora since 1909, *Proc. Bgham. nat. Hist. phil. soc.*, **20** (5), 19-37. A supplement to Amphlett and Rea's *Botany of Worcestershire* (1909).—[D.H.K.]

38, Warwick. Evans, R. E., 1966, Discovery of Epilobium nerterioides in Warwickshire, *Proc. Bgham. nat. Hist. phil. soc.*, **20** (5), 18. *Epilobium nerterioides*, a native of New Zealand, was discovered growing as a weed in Wroxall Churchyard near Warwick in 1964. Though widely naturalised in northern England, Scotland, Ireland and Wales it is rare in the Midlands and south-east England.—[D.H.K.]

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H.26-27, MAYO. Perring, F. H., 1966, New plant records for Co. Mayo, *Ir. Nat. J.*, **15,** 236-240. An annotated list of the more interesting plants, a number of which were new vice-county records, seen in Co. Mayo during the B.S.B.I. Field Meeting held in July, 1965.—[D.H.K.]

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ECOLOGICAL (see also TOPOGRAPHICAL)

ANDERSON, M. C., 1966, Ecological groupings of plants, *Nature*, **212,** 54-56.

AUSTIN, M. P. & ORLOCI, L., 1966, Geometric models in ecology, 2. On evaluation of some ordination techniques, *J. Ecol.*, **54,** 217-227.

BAKKER, D., BORG, S. J. ter & OTZEN, D., 1966, Ecological research at the Plant Ecology Laboratory, State University, Gröningen, *Wentia*, **15,** 1-24. Ecological studies carried out at the University of Gröningen since 1963 includes cultivation experiments on *Rhinanthus* species and *Odontites verna*, investigations on *Salicornia europaea* and experimental work on many Dutch weed species.—[D.H.K.]

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PHYTOSOCIOLOGICAL

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Česku, A., 1966, Estimation of the mean similarity between and within sets of vegetational relevés, *Folia Geobot. Phyto-Taxonom. Bohem.*, **1,** 93-100. Various possibilities of using Sörenson's coefficient of floristic similarity in plant sociology are summarized. A new formula, derived from that by Sörenson and based on constancy values is suggested in order to calculate the mean floristic similarity within a set of relevés.—[Author's summary.]

Dale, H. M., 1966, Weed complexes on abandoned pastures as indicators of site characteristics, *Can. J. Bot.*, **44,** 11-17. Prepared check lists of specific weeds on abandoned pastures were used to determine the frequency of occurrence of each pair of species. Contingency tables showing the degree of association of the species taken two at a time were used to work out constellation diagrams which showed several allied complexes. Each complex was found to be associated with certain physical site conditions.—(Author's summary.)

De Smidt, J. T., 1966, The inland heath communities of the Netherlands, *Wentia*, **15,** 142-162.

Doing, H., 1966, Enkele opmerkingen over het begrip 'hoofdformatie', *Gorteria*, **3,** 5-11. This paper is a contribution to a discussion among Dutch phytosociologists on the concept of 'chief formation', introduced by the author in former publications as a unit in the Braun-Blanquet vegetation system. It is contended that structure should play a major role mainly in the construction of the higher units of classification, floristics in the units of medium rank and species dominance in the lower units. The way in which these criteria can be applied in relation to each other is discussed and demonstrated on some examples of Australian and European vegetation. Special attention is given to the evaluation of dwarf shrub communities, tree savannas and tree and shrub deserts.—[Author's summary.]

Ivimey-cook, R. B. & Proctor, M. C. F., 1966, The application of association-analysis to phytosociology, *J. Ecol.*, **54,** 179-192. Association-analyses of phytosociological data from salt-marshes, fens and woodland in the Burren, Co. Clare [Ireland], are considered in relation to a traditional phytosociological treatment. It is concluded that association-analyses is of value in examining the consistency of evidence and conclusions in phytosociology and in detecting variations overlooked by traditional methods, and that it provided a powerful tool for the detection of faithful and differential species.

Some properties and limitations of association-analyses are discussed. In view of certain criticisms of nodal analysis, it is suggested that the two-way table is the most useful presentation of the data for phytosociological work, especially when the aim is a general classification of vegetation rather than a specific ecological examination of a single site. Sample size and distribution and the relation of association-analysis to ordination methods are briefly discussed.—[Authors' summary.]

Lambert, J. M. & Dale, M. B., 1964, The use of statistics in phytosociology, *Adv. Ecol.*, **2,** 59-100.

Lapraz, G., 1966, Etude de la végétation et des sols de la forêt communale de Rountzenheim (Bas-Rhin), *Bull. Soc. bot. Fr.*, **112,** 291-312. Two types of vegetation occur in this forest, one in the north is ash-hornbeam with *Quercus robur*, the other is oak-hornbeam on drier and usually more acid soils. A general drying-out is revealed, involving a retreat of hygrophilous and mesohygrophilous species with the advance of mesophilous species.—[E.B.B.]

MAHN, E. G., 1966, Die ökologisch-soziologischen Artengruppen der Xerothermrasen Mitteldeutschlands, *Bot. Jb.*, **85**, 1-44. Attempts were made to divide the species forming the xerothermic grassland communities of Middle-Germany into 'ecological-sociological groups'. The study is based on a detailed comparison of the sociological behaviour, ecological variation and geographical distribution of the various species occurring in the area studied. Special attention has been paid to the most important habitat factors required by the species within the xerothermic grassland communities. In forming these groups for a distinct phytogeographical region it is aimed to give a better ecological interpretation to the sociological classification of these vegetation units.—[Author's summary.]

MAJOR, J. & PYOTT, W. T., 1966, Buried viable seeds in two Californian Bunchgrass sites and their bearing on the definition of a flora, *Vegetatio*, **13**, 253-282. The authors claim that a complete description of a plant community should include details of the buried viable seeds in the soil, and that the plants occurring in this form are part of the flora, which helps to determine the community even though they are not readily in evidence.

Details are provided of investigations carried out for viable seeds in two grazed and ungrazed sites in California.—[D.H.K.]

MORAVEC, J., 1966, Zur Syntaxonomie der Carex davalliana-Gesellschaften, *Folia Geobot. Phyto-Taxonom. Bohem.*, **1**, 3-25.

RABOTNOV, T. A., 1966, Peculiarities of the structure of polydominant meadow communities, *Vegetatio*, **13**, 109-116.

STIEPERAERE, H., 1966, Een voorlopige typologie van begroeiingen met Erica cinerea in West-Vlaanderen, *Gorteria*, **3**, 59-60. A short description of the plant associations in which *Erica cinerea* is found in the Belgian province of West-Vlaanderen. —[D.H.K.]

VAN DER MAAREL, E., 1966, Dutch studies on coastal sand dune vegetation, especially in the Delta region, *Wentia*, **15**, 47-82.

VAN DER VOO, E. E., 1966, Het hooiland floraeservaat bij 'de Elshof' aan het Naardmeer, *Gorteria*, **3**, 63-74. A plot of grassland between a low dike and the margin of the Naardermeer, a lake near Naarden (prov. N. Holland), was withdrawn from grazing by cattle and is now used as a hayfield without manuring, A vegetation sketch made in the year 1961 comprises 36 units of vegetation belonging to 9 higher units. The alliance *Agropyro-Rumicion crispi* is in agreement with the varying circumstances in the habitat. Moles and worms increase the richness in individuals of the said alliance. Soil-analyses afforded interesting ecological facets of some plant species.—[Author's summary.]

VAN LEEUWEN, C. G., 1966, A relation theoretical approach to pattern and process in vegetation, *Wentia*, **15**, 25-46.

HISTORICAL

ALLEN, D. E., 1966, An early Welsh plant collection at Cambridge, *Nature Wales*, **10**, 14-16. The author draws attention to, and gives details of, 47 gatherings of Welsh plants made by the Rev Robert Foulkes (1702?-29). These specimens are now preserved in Herb. Martyn at Cambridge.—[D.H.K.]

BELL, G. D. H., 1966, The Mendel Centenary: Chairman's introduction, *Adv. Sci.*, **23**, 118-120. The introduction to a symposium held in 1965 to commemorate the commencement of Gregor Mendel's experiments in 1865.—[D.H.K.]

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Riedl, H., 1966, H. W. Schott's botanical publications, *Taxon*, **15,** 44. Supplementary titles are provided to the bibliography of the works of H. W. Schott printed in *Taxon*, **14,** 208-213 (1965).—[D.H.K.]

BIOGRAPHICAL

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OBITUARIES

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Chase, Corrie Denew, 1878-1965: *Ir. Nat. J.*, **15,** 214-215 (1966).

Jane, Frank William, 1901-63: *Essex Nat.*, **31,** 333 (1966).

Reichgelt, Theodorus Johannes, 1903-66: *Gorteria*, **3,** 61-62 (portrait) (1966).

Sandwith, Noel Yvri, 1901-65: *Taxon*, **15,** 245-255 (portrait, and chronological list of publications) (1966).

Warburg, Edmund Frederic, 1908-66: *The Times*, 11 June 1966: *Nature*, **212,** 240 (1966): (Tributes) *The Times*, 14 and 24 June 1966.

PALAEOBOTANY

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Hundt, R., 1966, Ökologisch-Geobotanische Untersuchungen and Pflanzen der Mitteleuropäischen Wiesenvegetation, *Bot. Stud. Jena*, **16,** Pp 176.

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HERBARIUM, LABORATORY, RECORDING TECHNIQUES, ETC.

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Macdonald, R. D., 1966, Electronic data processing methods for Botanical Garden and Arboretum records, *Taxon*, **15,** 291-295.

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Sokal, R. R. & Sneath, P. H. A. 1966, Efficiency in taxonomy, *Taxon*, **15,** 1-21. Modern techniques such as the use of electronic data processing and computers as an aid to taxonomists are discussed, and methods to improve the efficiency of the training of systematists are put forward.—[D.H.K.]

Stafleu, F. A., 1966, Authors, taxa, names and computers, *Taxon*, **15,** 109-114.

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Wells, J. R., 1966, Toward a more colorful taxonomy, *Taxon*, **15,** 214-215. The author stresses the need for an up-to-date standard guide to the colours of flowers, and suggests that the International Association for Plant Taxonomy, under the proper framework of the International Code of Botanical Nomenclature might consider the desirability of selecting a standardized reference for plant flower colours for use in the field, herbarium and laboratory. The possible use of computers in solving this problem is mentioned.—[D.H.K.]

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NOMENCLATURE AND BOTANICAL TERMINOLOGY

Bunting, C. S., 1966, Typification of Corydalis bulbosa (Fumariaceae), *Baileya*, **14,** 40-44. A discussion on the nomenclatural tangle involving the name *Corydalis bulbosa*. The author claims that the epithet *bulbosa* when used at the specific level should be used as first applied, i.e. by Miller in 1768, he further points out that in *Flora Europaea*, vol. 1, *C. cava* (L.) Schweigg. & Koerte is placed under *C. bulbosa* (L.) DC. as a synonym. According to conclusions reached by the author, and other specialists in the genus *Corydalis*, *C. bulbosa* (L.) DC. (1803) pertains to *C. solida* (L.) Swartz, while the later *C. bulbosa* (L.) Persoon (1807) must be considered a synonym of *C. cava* (L. emend. Mill.) Schweigg. & Koerte. The correct names and synonymy of the species are thus considered to be:—
C. bulbosa (L. emend. Mill.) DC. (*C. solida* (L.) Mill.; *C. solida* (L.) Sw.).
C. cava (L. emend. Mill.) Schweigg. & Koerte (*C. bulbosa* (DC.) Pers.: *C. tuberosa* DC.).—[D.H.K.]

Burtt, B. L., 1966, The publication of manuscript names, *Taxon*, **15,** 106-107.

Burtt, B. L., 1966, Proposal to remove an apparent anomaly in the typification of some conserved genera, *Taxon*, **15,** 307.

Chater, A. O. & Brummitt, R. K., 1966, Subspecies in the works of Friedrich Ehrhart, *Taxon*, **15,** 95-106. A detailed examination of the works of Ehrhart has revealed valid publication of 99 subspecific names between 1780 and 1789. Since these names appear to have been completely overlooked and were published in rare and obscure works a detailed list of them is provided together with sources of publication.—[D.H.K.]

Chater, A. O. & Brummitt, R. K., 1966, Subspecies in the works of Christiaan Hendrik Persoon, *Taxon*, **15,** 143-149.

Hansen, C., 1966, Isoëtes echinospora Durieu and the Flora Danica Illustrations, *Bot. tidsskr.*, **62,** 37-42. The author points out a crucial mistake in a recent paper claiming that *Isoëtes tenella* Léman ex Desv. is the first legitimate name for the species called *Isoëtes echinospora* Durieu.—[D.H.K.]

Holub, J., 1966, Bemerkungen zur Nomenklatur der in de Tschechoslowakei vorkommenden Vertreter des Komplexes Myosotis palustris, *Preslia*, **38,** 130-136.

INDEX KEWENSIS PLANTARUM PHANEROGAMARUM: SUPPLEMENTUM TERTIUM DECIMUM NOMINA ET SYNONYMA OMNIUM GENERUM ET SPECIERUM AB INITIO ANNI MDCCCLVI AND FINEM ANNI MDCCCLX NONNULLA ETIAN ANTEA EDTA COMPLECTENS.

Ductu et consilio georgii taylor confecerumt herbarii horti regii botanici kewensis. Pp 149. Oxonii e Prelo Clarendoniana. 1966. The Thirteenth Supplement to Index Kewensis covering genera and species described between 1950 and 1960.—[D.H.K.]

Rauschert, S., 1966, Die Legitimät des Gattungsnamen Thelypteris Schmidel, *Taxon*, **15**, 180-184.

Rauschert, S., 1966, Zur Nomenklatur der Farn-und Blütepflanzen Deutschlands, *Feddes Rep.*, **73**, 47-58. Comments and emendations on the nomenclature used for various species by Rothmaler in his *Excursionflora von Deutschland.*—[D.H.K.]

Slastenenko, E. P., 1963, Species and speciation, *Biol. Jaarb.*, **31**, 158-168. The author reviews the criteria of 'species' as designated by various authors, and, proposes the following definition:- 'Species is an aggregate of the similar individuals or groups of individuals of common origin, which structurally and biologically are incompatible with other species'.—[D.H.K.]

Stearn, W. T., 1966, *Botanical Latin, History, Grammar, Syntax, Terminology and Vocabulary*. Pp xiv + 566. Nelson. London. Price 105/-. A comprehensive and most useful guide to the essential language of botanical latin.—[D.H.K.]

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MISCELLANEOUS

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Bobrov, E. G., 1966, Le rôle de l'hybridation introgressive dans la flore de la Sibérie et de l'Europe orientale, *Acta bot. hung.*, **12**, 1-8.

Brehm, B. G., 1966, Taxonomic implications of variation in chromatographic components, *Brittonia*, **18**, 194-202.

Brightman, F. H., 1966, *Oxford Book of Flowerless Plants*. Illustrated by Nicholson, B. E. Pp 232 + 96 colour plates, etc. Oxford. Price 42/-. Includes details of Lycopsida, Sphenopsida, Pteropsida, etc.—(D.H.K.)

Davidsson, I., 1963, Slaedingar, *Nátturúfraedingurinn*, **33**, 166-186. A systematic list of 169 species known to have been introduced into Iceland between 1900 and 1963. The family with the greatest representation is Cruciferae with 26 species, followed by Gramineae with 24 species, Compositae with 22 species and Papilionaceae with 18 species. Notes are provided on the history and establishment of some of the species.—[D.H.K.]

Dean, M. H., 1966, A survey of the Uranium content of vegetation in Great Britain, *J. Ecol.*, **54**, 589-595.

Dhien, R., 1966, Un peuplement initial de végétation sur une ancienne voie ferrée, *Cah. Nat.*, **22**, 42-44. An interesting list is given of species found colonising a disused railway since 1948. Some measure of frequency is indicated as well as of the species distributional range. The zone, between Cercy and Briffaut, France, is about 10 kilometres long.—[E.B.B.]

El-Antlaby, H. M. M. & Wareing, P. F., 1966, Stimulation of flowering in certain short-day plants by Abcisin, *Nature*, **210**, 328-329. Experiments were carried out on a number of short-day plants by using the newly discovered growth-regulator, abcisin II ('dormin'). It was found that abcisin II appeared to be effective in stimulating flowering in the short-day plants. *Pharbitis nil*, *Chenopodium rubrum* and *Ribes nigrum*, but attempts to induce flowering in other short-day plants have so far failed.—[D.H.K.]

Fincham, J. R. S., 1966, From Mendel's factors to genes as functional units, *Adv. Sci.*, **23,** 124-128.

Frioriksson, S., 1965, Fjörukál i Surtsey og fraeflutninger á Sjó, *Náttúrufraedingurinn*, **35,** 97-102. The first vascular plant species to colonise the new volcanic island of Surtsey, off the coast of Iceland, was *Cakile edentula*. Three small seedlings were found growing on a sandy beach on 3 June 1965; a few days later some additional twenty seedlings were found in another part of the island. The plants originated from seed washed up by the sea, the nearest known colony of the species being some 20 kilometres away. The plants did not mature as a few weeks later they were buried under a shower of ashes carried from the even more recent volcanic island of Syrtlingur.

Experimental studies on seeds of *Cakile edentula* showed that some were still viable after being immersed in sea water for four months.—[D.H.K.]

Gadella, T. W. J., Kliphuis, E. & Mennega, E. A., 1966, Chromosome numbers of some flowering plants of Spain and southern France, *Acta bot. neerl.*, **15,** 484-489. Chromosome numbers of 32 species of phanerogams from Spain and southern France are given. Some of these species, e.g. *Silybum marianum* and *Lobularia maritima*, occur also in Britain. The counts made were in accordance with counts previously reported for the same species in other parts of Europe.—(D.H.K.)

Gilbert, J. L., 1966, Compiling a County Flora, *Wild Life News*, **1,** 6-7. A short account on how to compile a County Flora, with references to useful works to assist the would be compiler.—[D.H.K.]

Harper, J. L. & Benton, R. A., 1966, The behaviour of seeds in soil; 2. The germination of seeds on the surface of a water supplying substrate, *J. Ecol.*, **54,** 151-166.

Heslop-Harrison, J., 1966, Cytoplasmic continuities during spore formation in flowering plants, *Endeavour*, **25,** 65-72.

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Jackson, R. P. (Compiler), ASPT-IOPB Index of current taxonomic research, *Regnum Veg.*, **43,** Pp 72. An annotated list of specialists engaged on current research work, arranged in alphabetical order under Families and Genera. The index is very strong on American specialists but is inadequate so far as the European coverage is concerned.—[D.H.K.]

Jovet, P. & Brunerye, L., 1966, Trois plantes rares aux environs de Chateau-Thierry (Aisne), *Cah. Nat.*, **22,** 46-48. Situated at 80 kilometres to the east of Paris, the Bois de Barbillon and its surroundings present a varied vegetation. *Cicerbita alpina*, not hitherto recorded from the neighbourhood of Paris, occurs there in company of *Senecio fuchsii*. Another rare species, *Lathraea squamaria*, exists in the locality. The associated species are recorded. Botanists must scrupulously respect these three species.—[Authors' summary, translated by E.B.B.]

King, L. J., 1966, *Weeds of the World: Biology and Control*. Pp xxxiii + 526. Plant Science Monographs. Edited by Professor Nicholas Polunin, Leonard Hill, London and Interscience Publications Inc., New York. Price 105/-.

Lange, M., 1966, Fourth Flora Europaea Symposium: Denmark, 1st-10th August 1965, *Bot. tidsskr.*, **61,** 325-334. An account of the Flora Europaea Symposium held in Denmark in 1965.—[D.H.K.]

Lindroth, C. H., 1965, Skaftafell, Iceland, a living glacial refugium, *Oikos Suppl.*, **6**, Pp 142. An ecological account of an island of about 27 kilometres, off the Icelandic coast. Details are given of situation, climate, influence of human activity, etc., on the fauna and flora. A systematic list of the plants of the island is included.—[D.H.K.]

Long, C. A., 1966, Dependence in taxonomy, *Taxon.*, **15**, 49-51.

Löve, A., 1966, I.O.P.B. Chromosome number reports, 6, *Taxon*, **15**, 117-128. Further chromosome numbers are provided for a number of vascular plants, those of interest to British botanists are:- (from Indian material), *Lathyrus aphaca*, $n = 7$; *Melilotus alba*, $n = 8$; *Vicia sativa*, $n = 6$; *V. tetrasperma*, $n = 7$: (from France), *Plantago indica* and *P. lagopus*, both $2n = 12$: (from Hungary), *Plantago media*, $2n = 12$: (from the U.S.S.R.), *Plantago media*, $2n = 12$ & 24: (from Norway and Italy), *Plantago media*, $2n = 24$: 7, *loc. sit.*, **15**, 155-163: (from the U.S.A.), *Mentha pulegium*, $n = 20$; *Prunella vulgaris*, $n = 14$: (from Sierra Leone), *Bidens pilosa*, $2n = 72$.—[D.H.K.]

Lowson, J. M., 1966, *Textbook of Botany*. 14th edition, revised by E. W. Simon, K. J. Dormer & J. N. Hartshorne. Pp viii + 679 + 18 plates. London Univ. Tutorial Press. Price 26/-.

Mikkelsen, V. M. & Laursen, F., 1966, Markukrudtet i Danmark omkring 1960, *Bot. tidsskr.*, **62**, 1-26. Studies on the field weeds of Denmark carried out in the early 1960's.—[D.H.K.]

Mikkola, R., 1966, Ratakasvihavaintoja Siitaman ja Lylyn seudulta (orivesi, Kangasla ja Juupajoki, Ta), *Mem. Soc. Fauna Flora fenn.*, **42**, 14-26. An account of the flora of railways in South Häme, Finland, based on observations made from the early 1940's to 1965. Detailed lists of the species noted are given, together with some ecological data.—[D.H.K.]

Moore, D. M. & Sladen, W. J. L., 1965, Some recent records of native and alien plants from the Falkland Islands, *Brit. Antarctic Survey Bull.*, **7**, 29-35. *Suaeda fruticosa* Forsk. *sens. lat.* is reported for the first time from the Falkland Islands, and details are provided of a number of adventive species new to the islands.—[D.H.K.]

Mosquin, T., 1966, Toward a more useful taxonomy for chromosomal races, *Brittonia*, **18**, 194-202.

Polatschek, A., 1966, Cytotaxonomische Beiträge zur Flora der Ostalpenländer, 1, *Öst. bot. Z.*, **113**, 1-46. Cytotaxonomic studies on a number of genera from the eastern Alps, particularly *Arabis*, *Cardaminopsis*, *Erysimum* and *Thlaspi*.—[D.H.K.]

Roberts, H. A. & Stokes, F. G., 1966, Studies on the weeds of vegetable crops, 6. Seed populations of soil under commercial cropping, *J. appl. Ecol.*, **3**, 181-190. Soil samples obtained between 1958 and 1962 from 58 fields distributed in 23 English counties were kept moist in unheated greenhouses for 2 years. Seedlings were identified and recorded as they appeared and a table shows the 41 most common weeds in order of frequency of occurrence. *Stellaria media* was found in all 58 samples, *Poa annua* in 57, *Urtica urens* in 54, *Senecio vulgaris* in 52, *Capsella bursa-pastoris* in 50, *Chenopodium album* in 49, *Veronica persica* in 41, *Polygonum aviculare sensu lato* in 33, *Matricaria matricarioides* in 28, *Plantago major* in 24, and *Tripleurospermum maritimum* subsp. *inodorum* and *Polygonum persicaria* in 21. The highest populations were found in *Chenopodium album*, *Matricaria matricarioides* and *Poa annua*.—[D.H.K.]

Ross-craig, S., 1966, *Drawings of British Plants*. Part XXII. Scrophulariaceae (1). 39 Plates. Bell. London. Price 11/6.

Scagel, R. F., **Bandoni**, R. J., **Rouse**, G. E., **Schofield**, W. B., **Stein**, J. R. & **Taylor**, M. C., 1966, *An Evolutionary Survey of the Plant Kingdom.* Pp xi + 658. Blackie & Son Ltd., London & Glasgow. Price 80/-.

Schroevers, P. J., 1966, Some observations on micro-coeneses in a bog region influenced by man, *Wentia*, **15**, 163-190.

Schwanitz, F., 1966, *The Origin of Cultivated Plants.* Pp vi + 175. Harvard University Press. Cambridge, Mass., Price. $4.75.

Smejkal, M., 1966, Neue oder wenig bekannte Pflanzen der tschechoslowakischen Flora, 2, *Preslia*, **38**, 249-262. Recent additions to the Czech flora include *Minuartia hybrida* subsp. *hybrida*, *Vicia lathyroides* L. subsp. *olbiensis* (Reut & Shuttl. ex Rouy) Smejkal, comb. nov. and *Veronica scardica* Griseb. A number of adventives, chiefly of garden origin are also included. A key is provided to the species of *Althaea* found in the country, and the various species of *Oenothera* recorded there are also discussed.—[D.H.K.]

Solleveld, M. H., 1966, De adventieve flora bij de werkhaven van Hellevoetsluis, *Gorteria*, **3**, 49-50. A list of species found near Hellevoetsluis, prov. S. Holland, on heaps of stones used for the Delta-works. The stones have been imported from the Westerwald and the Eifel in Germany (basalt), the Ardennes in Belgium (limestone), the valleys of Main and Meuse (gravel), and the southern part of the Netherlands province of Limburg (slacks from the mines).—[Author's summary.]

Soó, R., 1964, *A magyar flóra és vegetáció rendszertani-novényföldrajzi kézikönykve*, 1./*Synopsis Systematico-Geobotanico Florae Vegetationisque, Hungariae*, 1. Pp 589. Budapest. The first volume of this extensive new flora of Hungary covers Bryophyta, Pteridophyta and Gymnospermae.—[D.H.K.]

Soó, R., 1966, Species et combinationes novae florae Europae praecipae Hungariae, 4, *Acta bot. hung.*, **12**, 111-124.

Steindrósson, S., 1964, Um i isalddartöntur, *Náttúrfraedingurinn*, **34**, 49-76. Notes on a number of species which are believed to have survived the Ice Age in Iceland. These include *Cerastium arcticum*, *Carex rupestris*, *Diapensia lapponica*, *Sagina caespitosa* and *Linum catharticum.*—[D.H.K.]

Stewart, W. D. P., 1966, *Nitrogen Fixation in Plants.* Pp [9] + 168 + 7 plates. Athlone Press, London. Price 25/-.

Stoutjesdijk, P., 1966, In the measurement of the radiant temperature of vegetation surfaces and leaves, *Wentia*, **15**, 191-202.

Taylor, R. L. & **Brockman**, R. P., 1966 Chromosome numbers of some western Canadian plants, *Can. J. Bot.*, **44**, 1093-1103. Counts are given on 97 Canadian species, these include:- *Deschampsia cespitosa*, $2n = 26$; *Koeleria cristata*, $2n = 14$; *Poa alpina*, $2n = 42$; *Tofieldia pusilla*, $2n = 30$; *Thelypteris* (*Gymnocarpium*) *dryopteris*, $2n = c.73$; *Myosotis alpestris*, $2n = 12$ and *Sambucus racemosa*, $2n = 19$.—[D.H.K.]

Thoday, J. M., 1966, Mendel's work as an introduction to genetics, *Adv. Sci.*, **23**, 120-124.

Titz, W., 1966, Chromosomenzahlen dreier Angiospermenaster aus Österreich, *Öst. bot. Z.*, **113**, 187-190. Chromosome counts made on Austrian species include *Aethusa cynapium*, $n = 10$ and $2n = 20$, and *Cephalanthera rubra*, $n = 24$ and $2n = 48$.—[D.H.K.]

Tolmatchev, A. I., 1966, Die Evolution der Pflanzen in arktisch-Eurasien während und nach der quaternären Vereisung, *Bot. tidsskr.*, **62**, 27-36.

Van Leeuwen, C. G., Het botanisch beheer van natuurreservaten op structuur-oecologische grondslag, *Gorteria*, **3**, 16-28. The author puts forward proposals for the botanical control of nature reserves based on structure ecology to replace the present system of human control.—[D.H.K.]

Van Ooststroom, S. J. & Reichgelt, T. J., 1966, Nieuwe vondsten van zeldzame planten in Nederland hoofdzakelijk in 1965, *Gorteria*, **3**, 33-43. A list is provided of new localities of rare and interesting species found in the Netherlands mainly during 1965.—[D.H.K.]

Van Ooststroom, S. J. & Reichgelt, T. J., 1966, Aanwinsten voor de Nederlandse adventief-flora, 9, *Gorteria*, **3**, 51-59. Acquisitions to the adventive flora of the Netherlands, mostly made in 1965, include *Vicia pseudocracca* Bertol., *Verbascum macrocarpum* Boiss., *Linaria origanifolia* (L.) DC., *Scrophularia peregrina* L., *Picris sprengeriana* (L.) Poir., *Eragrostis multicaulis* Steud. and a number of garden escapes.—[D.H.K.]

Williams, C. B., 1966, The biologist's lot, *New Scient.*, **31**, 744-746. An analysis of the occupations of the Fellows of the Royal Society shows that fewer biologists are elected to its eminent circle than workers in other sciences.—[D.H.K.]

BOOK REVIEWS

Walahfrid Strabo, Hortulus. Translated by Raef Payne, commentary by Wilfrid Blunt. The Hunt Botanical Library, Pittsburgh, Pennsylvania 1966. (Number 2 of the Hunt Facsimile Series.)

It is doubtful if many readers of this journal will have heard of Walahfrid Strabo—'Walahfrid the Squint-eyed'—who was born, so the introduction tells us, about the year 809 in south-west Germany, nor be aware of the reputation of his poem *Hortulus*. As a reviewer, I admit to almost complete ignorance and it is interesting to learn that the *Hortulus* which was written by Strabo about A.D. 840 is one of the landmarks of gardening literature. According to Dr G. H. M. Lawrence's Foreword, *The Little Garden*, as it is in English, has survived longer than anything else of the literature of gardening and should live for more than as long again 'not because of gardening innovations, accounts of new plants, or pharmacological discoveries reported in it, but because of its beautiful poetry, because it is full of man's love for the earth and for the plants he grows in it. It is pure gardening literature, not an herbal nor an agricultural account'. This being so it seems perhaps unfortunate that the first adequate translation of the work should appear in a luxurious and consequently expensive limited edition of 1,500 copies. It will still remain the preserve of the elite who are fortunate enough to find a copy in a large botanical library.

It is, therefore, as a select work of scholarship that the edition must be reviewed. Photographic negatives of a vellum manuscript of the *Hortulus* in the Vatican Library were made available to the Hunt Botanical Library and this is reproduced in facsimile in the present volume, together with a transcription of that copy in classical Latin form and an English translation in free verse. The translation by Mr Raef Payne of the Classical department at Eton is lucid and sensitive, using the language of our time. The whole atmosphere of the work is reminiscent of Virgil's *Georgics*. A sample is the following on Fennel:

> Let us not forget to honour fennel. It grows
> On a strong stem and spreads its branches wide.
> Its taste is sweet enough, sweet too its smell;
> They say it is good for eyes whose sight is clouded,
> That its seed, taken with milk from a pregnant goat,
> Eases a swollen stomach and quickly loosens
> Sluggish bowels. What is more, your rasping cough
> Will go if you take fennel-root mixed with wine.

The whole book is beautifully printed as one has come to expect of publications of the Hunt Botanical Library. The Latin and English texts of the poem are ornamented by linoleum cuts of the plants referred to, overprinted in green. The Linson vellum binding and the marbled end papers combined with the cream coloured paper make the book an elegant production. A veritable galaxy of botanical talent has been assembled in the preparation of this edition of Strabo's *Hortulus*. The only error, if such it be, that I have detected is the spelling *Artemesia* which occurs several times instead of the more usual *Artemisia*.—V. H. Heywood.

Companion to Flowers. By David McClintock. Pp 253 + 21 plates. G. Bell & Sons Ltd., London. 1966. Price 30/-.

This is a book covering a very wide range of botanical and horticultural subjects from the early history of botany to the complexities of modern scientific nomenclature, from medicinal uses of plants to genetics and cytotaxonomy, and a host of other topics. Written in the author's inimitable, chatty style I found certain chapters informative, interesting and amusing and some others tedious and irritating.

David McClintock is, in my opinion, at his very best when relating personal anecdotes, and being one of the most widely travelled amateur British botanists who has in his time known many of the 'greats' he has a number of fascinating stories to tell, and I am sorry that he did not draw even further on his reservoir of reminiscences. Considerable research has undoubtedly gone into the preparation of the work and numerous data on the British Flora have been accumulated to form what is perhaps best described as a botanist's 'bedside book' or a modern version of 'Memoirs for the Curious'.

Factors which I found distracting were the continual usage of the years of birth and death following the names of deceased botanists, and others, in one instance a celebrated Scottish comedian(!) and the insistence in using capital letters, where applicable, to commence specific names of plants. The former, though extremely useful in a biographical work, seems misplaced in a book of a popular nature. In the latter case the author exercises his right in using capital letters, but to refer (page 70) to the now almost universal practice of adopting small letters instead of capitals to commence certain specific names as 'slipshod barbarism' is simply pedantic.

There are a few points on which I would beg to disagree with Mr McClintock. *Nardurus maritimus* is referred to as a 'dull and insignificant' plant, but it is, in my opinion, when examined carefully with a lens, like *Aira praecox* and *Mibora minima*, a most attractive, diminutive grass. *Impatiens balsamifera* is referred to as 'Busy Lizzie', and reluctant as I am to disagree with the author, who has a far wider knowledge of cultivated species than myself, I have always understood that *Impatiens balsamifera* is commonly grown as a garden plant, while the pot-plant 'Busy Lizzie', a much more tender subject, usually consists of *Impatiens sultanii* or *I. hostii* or hortal hybrids between those two species.

There are very few misprints in the book, indeed, the only one that I have noted is on page 171 where *Spergula morisonii* is referred to as *Spergula Moisonii*. The index to the work is excellent and most comprehensive.—D. H. Kent.

Flore Générale de Belgique. Spermatophytes. Vol. 5-fasc. 1. Pp 108. Jardin Botanique de l'État, 236 Rue Royale, Bruxelles. 1966. Price not stated.

It is now some sixteen years since the appearance of the first volume of this Flora by Dr A. Lawalrée. This covered the Pteridophytes and since then, with the assistance of a few specialists, he has completed four volumes of the Spermatophytes, and the first fascicle of the fifth. The present part covers Tiliaceae, Malvaceae, Guttiferae, Elatinaceae, Cistaceae, and Violaceae with the same wealth of information. The distribution maps, excellent illustrations, full citations, and adequate accounts of variation, hybrids, and aliens are amongst the features which render the *Flore Générale de Belgique* so valuable to British botanists as well as to our colleagues in Belgium. It is to be hoped that every effort will be made to bring out the parts more frequently so that this major work may be completed within a reasonable time.—J. E. Lousley.

OBITUARY

DR E. F. WARBURG

When Dr E. F. Warburg died on 9th June, 1966 at the early age of 58 Britain lost a most distinguished botanist.

Dr Warburg, or Heff as he was nearly always known, will be sorely missed by those interested in field and taxonomic botany in this country. He was an unexcelled field botanist and the breadth of his knowledge of the British flora was often a source of wonder to students and friends. As a teacher he inspired many students with a lasting interest in field botany and even for the most knowledgeable excursions with Heff were stimulating and rewarding. He was patient with students, not minding how many times he named a plant for them and with more experienced botanists his manner of correcting errors of identification was such as never to give offence. There was always something to learn from his comments on plants submitted to him for identification. His commanding presence, sound taxonomic judgement and clarity of exposition won him a leading position amongst British botanists. He was perhaps best known as one of the joint authors of the *Flora of the British Isles* (by A. R. Clapham, T. G. Tutin & E. F. Warburg, Cambridge, 1952 & 1962), but in addition to his interest in and knowledge of higher plants he was also a leading authority on bryophytes. At the time of his death he was engaged in writing a British moss flora with A. C. Crundwell.

Edmund Frederic Warburg was born on the 22nd March, 1908. His father was Sir Oscar Warburg, a business man and former chairman of the London County Council and his mother was Catherine, daughter of Mr Justice Byrne. The family, of German-Jewish origin, has distinguished botanical connections, the best known being Otto Warburg the biochemist of Warburg manometer fame and Otto Warburg, taxonomist and author of *Monsunia*. For many years their home was Boidier at Headley in Surrey. Sir Oscar was a keen gardener and built up a large collection of plants including *Cistus*, *Berberis* and oaks. Heff inherited his father's interest in gardening and they published a joint paper on *Cistus* in the *Journal of the Royal Horticultural Society* in 1930. Heff himself built up a collection of interesting and unusual plants in his garden at Oxford and one of its features was the display of species *Crocus* in the late winter. Heff was responsible for the introduction into cultivation of *Daboecia azorica* following an expedition to the Azores in 1929.

Heff was educated at Marlborough College and went up to Trinity College, Cambridge as a Scholar in Mathematics in 1927. He obtained a double first in the Natural Sciences Tripos taking Botany as his Part II subject and later obtained a Ph.D. for a cytotaxonomic study of the Geraniales under the direction of Miss E. R. Saunders. He was elected a research fellow of Trinity College in 1933.

He went to Bedford College, London as an assistant lecturer in 1938 and in 1941 joined the R.A.F. He was attached to a photographic interpretation unit at Medmenham, Buckinghamshire and it was whilst here that he became interested in bryophytes. He returned to Bedford College after the war and in 1948 went to the Botany School, Oxford at the invitation of Professor Osborne as University Demonstrator in Botany and Curator of the Druce Herbarium. He was noted for his sound common sense concerning academic matters and his defence of some of the more traditional aspects of botany. In 1964 he was promoted to a readership in plant taxonomy and elected a Fellow of New College.

Heff was a very modest and unambitious man and published relatively little. It is perhaps unfortunate that he limited his interests mainly to the British Flora as his taxonomic judgement would have been of inestimable value in a wider field. After the war he concentrated his spare time interests on bryophytes whilst, however, retaining his interest (particularly in *Sorbus*) and teaching in flowering plants: His contribution to the first edition of the *Flora of the British Isles* and the care and time he spent on revising this contribution to the second edition is noteworthy. He possessed the rare ability of being able to cope simultaneously with both bryophytes and higher plants in the field, an ability that many of his companions envied. He discovered many bryophytes new to Britain and in 1963 edited the third edition of *A Census Catalogue of British Mosses*, a very noteworthy publication which involved a great deal of careful investigation and research.

Heff joined the Botanical Society of the British Isles in 1946 and during the next 20 years served on many committees and was a member of the Council. He was editor of *Watsonia* from 1949 to 1960. He was elected an Honorary Member of the society in 1960 and President in 1965. He was also a Recorder of Mosses for the British Bryological Society from 1946 and President of the same society from 1962 to 1963.

His familiar figure will be very much missed at meetings of various botanical societies and for some of his closer friends part of the pleasure of such meetings will be lost.

In 1948 he married Primrose Barrett of Melton, Suffolk, who had been one of his students at London and they had two sons and a daughter.

I am grateful to Professor P. W. Richards for help with biographical details.

PUBLICATIONS BY DR E. F. WARBURG

1930

(with O. Warburg)—A preliminary study of the genus *Cistus*. *Jl. R. Hort Soc.*, **55,** 1-52.

1932

(with T. G. Tutin)—Notes on the flora of the Azores. *J. Bot., Lond.*, **70,** 7-13, 38-46.

1933

(with O. Warburg)—Oaks in cultivation in the British Isles. *Jl. R. hort Soc.*, **58,** 171-188.

1938

Taxonomy and Relationships in the Geraniales in the Light of their Cytology. I. *New Phytol.*, **37,** 130-157.

Taxonomy and Relationships in the Geraniales in the Light of their Cytology. II. *New Phytol.*, **37,** 189-210.

1947

A form of *Seligeria recurvata* (Hedw.) B. & S. from Buckinghamshire. *Trans. Br. bryol. Soc.*, **1,** 14-15.

1949

Trochobryum carniolicum—new to the British Isles. *Trans. Br. bryol. Soc.*, **1,** 199-201.

1950

Nomenclature and corrections to British Plant List. VII. *Watsonia*, **1,** 313-316.

(with E. W. Jones)—*Grimmia andreaeoides* Limpr. *Trans. Br. bryol. Soc.*, **1,** 367-368.

1951

Corrections to the British Plant List. VIII. *Watsonia*, **2,** 102-103.

Eurhynchium pulchellum (Hedw.) Jennings var. *praecox* (Hedw.) C. Jens. in Suffolk. *Trans. Br. bryol. Soc.*, **1,** 489-490.

1952

(with A. R. Clapham and T. G. Tutin)—*Flora of the British Isles*. 1st ed. Cambridge.

1956

(with E. W. Jones)—*Campylium hispidulum* (Brid.) Mitt. in Britain. *Trans. Br. bryol. Soc.*, **3,** 66-68.

Heterocladium macounii Best. *Trans. Br. bryol. Soc.*, **3,** 126-127.

1957

Two mosses from Scotland, new to the British Isles. *Trans. Br. bryol. Soc.*, **3,** 171-173.

Crocuses. *Endeavour*, **16,** 209-216.

Some new names in the British Flora. *Watsonia*, **7,** 41, 42, 43-47.

1958

Meesia tristicha Bruch & Schimp. in the British Isles. *Trans. Br. bryol. Soc.*, **3**, 378-381.

The *Cinclidotus* of the River Teme. *Trans. Br. bryol. Soc.*, **3**, 383-385.

1959

(with A. R. Clapham and T. G. Tutin)—*Excursion Flora of the British Isles*. Cambridge.

Plant Note. *Equisetum variegatum* Schleich. ex. Web. and Mohr. *Proc. bot. Soc. Br. Isl.*, **3**, 283.

(with A. C. Crundwell)—*Tortula virescens* (De Not.) De Not. new to the British Isles. *Trans. Br. bryol. Soc.*, **3**, 568-570.

1960

Weissai levieri (Limpr.) Kindb., new to Britain. *Trans. Br. bryol. Soc.*, **3**, 713-714.

Some taxonomic problems in weedy species. In Harper, J. L. *The Biology of Weeds*. 43-47.

1961

(with B. F. T. Ducker)—*Physcomitrium eurystomum* Sendt. in Britain. *Trans. Br. bryol. Soc.*, **4**, 95-97.

1962

(with A. R. Clapham and T. G. Tutin)—*Flora of the British Isles*. 2nd. ed. Cambridge.

(with A. J. E. Smith)—*Fissidens crassipes* Wils. ex B. S. & G., *F. mildeanus* Schimp. and *F. rufulus* B., S. & G. *Trans. Br. bryol. Soc.*, **4**, 204-205.

(with A. R. Perry)—*Playgyrium repens* (Brid.) B. S. & G., new to the British Isles. *Trans. Br. bryol. Soc.*, **4**, 335-336.

New combinations in British mosses. *Trans. Br. bryol. Soc.*, **4**, 247-248.

1963

(editor)—*Census Catalogue of British Mosses*. 3rd ed.

(with A. R. Perry)—*Platygyrium repens* in Britain. *Trans. Br. bryol. Soc.*, **4**, 422-425.

(with A. C. Crundwell)—*Seligeria oelandica* in Ireland, new to the British Isles. *Trans. Br. bryol. Soc.*, **4**, 426-428.

Notes on the bryophytes of Achill Island. *Ir. Nat. J.*, **14**, 139-145.

1965

Grimmia borealis in Britain. *Trans. Br. bryol. Soc.*, **4**, 757-759.

Pohlia pulchella in Britain. *Trans. Br. bryol. Soc.*, **4**, 760-762.

(with A. C. Crundwell)—*Tortula vectensis*, a new species from the Isle of Wight. *Trans. Br. bryol. Soc.*, **4**, 763-766.

(with J. A. Paton)—A new combination for a British hepatic. *Trans. Br. bryol. Soc.*, **4**, 831-832.

—A. J. E. Smith.

EXHIBITION MEETING, 1966

An Exhibition Meeting was held at the Department of Botany, British Museum (Natural History), London, S.W.7, on Saturday 26th November 1966 from 2.0 p.m. to 5.30 p.m.

About 300 members and guests attended. The following account compiled by Dr N. K. B. Robson is based on notes supplied by exhibitors.

ILLUSTRATIONS OF EARLY VASCULA

Six items were exhibited:

A photograph of a candle-box (by courtesy of the London Museum). This one-time ubiquitous household utensil, made of tin and small enough to slip into a pocket, served at least some botanists in the eighteenth century as a vasculum and may indeed have been the original of the metal collecting-case.

A vignette on the title-page of *Flora Londinensis* (1775): the earliest-known printed illustration of what appears to be a vasculum. The author, William Curtis, had been demonstrator to the Society of Apothecaries, some at least of whose members were using tin vascula on field excursions by 1720. It is therefore highly likely that the implement was familiar to him.

A photocopy of part of the manuscript of a lecture given by James Edward Smith to a group of his fellow-students at Edinburgh University in 1782 (now in the library of the Linnean Society of London). A small pen-and-ink sketch at the foot of the page is the earliest known illustration, in any form, of an undoubted vasculum.

Photographs of an original oil painting of William Aiton (1731-1793), the first Curator of Kew, now hanging in Museum No 1 at Kew (exhibited by kind permission of the Director); and of a later copy of this now hanging at the entrance to the Kew Herbarium. Until early in 1966 it had quite escaped notice that Aiton's hand (depicted holding a sprig of *Aitonia*) is resting on a vasculum, making this the third-earliest illustration of one now known.

This painting has traditionally been attributed to Zoffany, who lived at Kew and certainly acted as one of Aiton's pall-bearers. It is known to have been hanging in the library of Sir Joseph Banks in Soho Square by 1796. On Bank's death in 1820 it was given by Robert Brown to Aiton's family, and in 1851 presented to Kew by Aiton's nephew, W. Atwell Smith.

In an attempt to establish its date with some precision, it was brought to the attention of Mrs Mary Lightbown, the present leading authority on Zoffany; and after considerable research she has managed to uncover circumstantial evidence that the painter was, in fact, George Engleheart and that Aiton apparently sat for him in 1786-87. On grounds of style alone she would date it to the mid-1780's. It is certainly inferior in execution to works definitely known to be by Zoffany.

A copy of *The Naturalist's pocket-book, or Tourist's Companion*, by George Graves (1818), containing the earliest-known illustration in print specifically depicting a vasculum.

Colour photographs of an early German vasculum, of unknown date, made by an Erfurt firm, 'Suppliers to the Prussian Royal Family'. This is now in the possession of Professor Joseph Ewan of Tulane University, New Orleans, to whom it was given by the late Mrs Kathryn Kalmbach of Denver, Colorado. The dimensions—roughly 11 × 5 × 3 inches—are unusual and scarcely exceed those of the small type of vasculum prevalent in the late eighteenth century. The clasp-type fastening is also distinctly antiquated.—D. E. **Allen**.

THE ANNUAL SPECIES OF *SILENE*

The annual species of *Silene* in Europe are grouped into eleven Sections by A. O. Chater in the treatment adopted in *Flora Europaea* Volume 1.

Seed characters are apparently very important in classification; some Sections seem to be very heterogeneous with respect to the seed, whilst others are characterised by a particular type.

Seeds of the following six species were exhibited to show the extraordinary range of size and shape: *S. dichotoma* Ehrh., *S. nicaeensis* All., *S. laeta* (Aiton) Godron, *S. secundiflora* Otth, *S. conica* L. subsp. *conica* and *S. conoidea* L.—Mrs E. A. **Bari**.

THREE SPECIES OF SIGESBECKIA IN BRITAIN

—R. K. Brummitt.

See p. 19 for a full account of the material forming the basis of this exhibit.—**Ed.**

A BOTANICAL SURVEY OF MULL

The exhibit illustrated a field project that has been started by the Department of Botany, British Museum (Natural History) during the past year, in which it is proposed to make a detailed investigation of the botany of Mull, with its off-lying small islands (V.c. 103, Mid Ebudes, in part). Special attention will be paid to the ecological and geographical relationships of the flora, and it is hoped that with the facilities available in the department it will be possible to achieve a greater parity of treatment between the major plant groups than is normally possible in county Floras. Publications and specimens were shown to demonstrate the extent of our present knowledge of the flora, ranging from the description of the islands in Pennant's *Tour in Scotland* (1772) to the results of the department's own field parties during the past summer.

The purpose of the exhibit was to draw attention to the scheme and to invite the help of other botanists. As a result of the limitations of distance and time the department's work can be greatly enriched by the help of others, and generous contributions already received from Scottish botanists were acknowledged in the exhibit.

—J. F. M. **Cannon**.

THE DISTRIBUTION OF *LAMIUM ALBUM* IN THE BRITISH ISLES

Maps were shown both of the main distribution of *Lamium album* in the British Isles illustrating its increasing rarity to the north and to the west and on the high Pennines, and detailed ones of the Welsh distribution. These latter illustrated:-

1. all Welsh sites in relation to altitude showing a general limitation to lowlands below 800ft; the decreasing abundance with approach from the east towards the Welsh mountains; and the relative rarity of sites west of these.
2. the location of older records from pre-1875 onwards, where at many of which, *L. album* can still be found today.

3. the sites associated with railways.
4. and a 'not-to-be-taken-too-seriously' map of the coincidence of former Roman occupation sites with present *L. album.*

Provisional maps were also shown of the distribution of *Lamium album* in Ireland and in Scotland, where most localities probably occur below 500ft and where it is common only in parts of the east and south-east.

Some indication was given of the type of habitat preferred, such as 'village', roadside, railway-goodsyard, farmyard or garden; of the soil preference; and of some of the known modes of dispersal—e.g. transplantation of rhizome in soil for varying distances and by varying means.

The issue was raised as to whether the limitations of distribution indicated were due to climatic factors, or to historical ones associated with dispersal by human agency, or to a combination of both.—Miss A. CONOLLY.

DRYOPTERIS DILATATA agg.

This exhibit gave the distinguishing features of *Dryopteris assimilis* S. Walker and compared them with *D. dilatata* (Hoffm.) A. Gray and *D. carthusiana* (Vill.) H. P. Fuchs, the two species most likely to be confused with it. *D.* × *deweveri* (Jansen) Jansen & Wachter, the hybrid between *D. carthusiana* and *D. dilatata*, could also be confused with *D. assimilis* but is usually, if not always, growing in close proximity to the parents and in a habitat unsuitable for *D. assimilis. D. assimilis* does hybridise with *D. dilatata* and these triploids are best detected in the field by their abortive spores.

As one of us has shown (Walker. 1955), the genome of *D. assimilis* is present in *D. dilatata* and also in *D. carthusiana.* The other parents of these two tetraploids are as yet unknown.

The North American fern known as *Dryopteris dilatata* is a diploid, morphologically identical with *D. assimilis* and is best treated as conspecific. Another closely related species is *D. maderensis* Alston, also a diploid, the chromosomes of which pair with one of the two sets in European tetraploid *D. dilatata.*

Herbarium specimens and Stereoscan electronmicrographs of spores (kindly taken by the Cambridge Instrument Company) were shown, together with living fronds.

The distribution of *D. assimilis* in Europe and N. America was shown, and also a larger scale map of the British Isles which showed forty-eight 10 km square records, mainly in the Western Highlands, ranging from Orkney to isolated instances in Borrowdale and Snowdonia. It should be emphasised, however, that these outlier populations have not yet been examined cytologically. They may not be genetypically similar and *D. assimilis* as we circumscribe it at the moment may be an aggregate of two different diploid cytotypes.

REFERENCE

WALKER, S. (1955). Cytogenetic studies in the *Dryopteris spinulosa* complex—1. *Watsonia*, **3**, 193-209.

—J. A. CRABBE, A. C. JERMY & S. WALKER

DRYOPTERIS FILIX-MAS agg. IN BRITAIN

Nine major forms of *D. abbreviata*, *D. borreri* and *D. filix-mas* were exhibited and were labelled with *putative* genomial constitutions to avoid premature naming of new taxa. It was emphasised that these constitutions had been arrived at on morphological grounds only, but in several cases the chromosome number of the plant had been counted by Dr S. Walker of Liverpool University to whom the exhibitor was grateful for his cooperation. In other cases stomata and spore sizes gave a good indication as to ploidy.

This naming was based on the assumption that the whole aggregate as it appears in Britain stems from three ancestral, sexual diploids. These are:

1. *Dryopteris abbreviata* [genome A] which Manton has shown to be one parent of *D. filix-mas*.
2. The other parent of *D. filix-mas*, which is unknown but possibly a lowland form with a frond morphology similar to *D. villarii* and may be called for the purpose of the exhibit '*D. incognita*' [genome I].
3. A sexual '*D. borreri*' [genome B] with glossy frond, inflected indusium, dark scales, blackish axillary spots and oblong, truncate pinnules.

Thus *D. filix-mas* could be referred to as AAII.

The characters used to distinguish the three currently accepted aggregate species are given below. It should be emphasised that there is no single characteristic that will serve to distinguish these three.

DRYOPTERIS ABBREVIATA

Stock:	Branching freely.
Frond:	Concave at tip, often rather scaly (pale scales).
Pinnae:	Often concave.
Pinnules:	Often convex and twisted on their axis, with usually blunt teeth. 1st pair usually much the longest on each pinna. Lowest pinnule of bottom pinna $\frac{3}{4}$ stalked.
Sori:	Indusium adnate to lamina round sorus and inflected at margin which is usually glandular.
Spores:	Usually 40μ or less.
Stomata:	Normally between 47μ and 55μ.
Chromosomes:	$n = 41$ (diploid).
Habitat:	Mountain districts, usually on rocks or screes but also old walls. Sometimes under trees.

N.B. Most British 'abbreviatas' seem to be hybrids between two or more of the main varieties. There are possibly three subspecies involved here.

DRYOPTERIS FILIX-MAS

Stock:	Forming many crowns in exposed situations.
Frond:	Usually flat with pale brown or reddish brown scales.
Pinnae:	Usually flat.
Pinnules:	Very variable, usually flat with sharp teeth. Lowest pinnule of bottom pinna $\frac{3}{4}$ stalked.
Sori:	Indusium sometimes adnate to lamina, sometimes with upturned margins adpressed to lamina. Seldom inflected at margin. Margin with or without glands.
Spores:	Usually 40μ or more.
Stomata:	Usually from 56μ to 70μ.
Chromosomes:	$n = 82$.
Habitat:	Flourishes best in woodland, but grows almost everywhere from lowland bogs to over 3,000 feet on Scottish mountains.
Habit:	Small and often stunted forms on walls and rocks may have abnormally small pinnules and stomata. They can be recognized by their small pinnule teeth.

N.B. One species with three distinct varieties.

DRYOPTERIS BORRERI

Stock:	Forming many crowns in exposed situations.
Frond:	Usually glossy and very scaly with dark-streaked scales. Tip and pinnae often concave in forms with *D. abbreviata* ancestry. Usually with blackish axillary spots.
Pinnules:	Very variable according to ancestry. Lowest pinnule of bottom pinna varies from half to fully stalked.
Sori:	Sometimes very small. Indusium eglandular, margin inflected or not, adnate to lamina or with upturned margins adpressed to lamina.
Spores:	Varying in size with few or many abortions.
Stomata:	From 48μ to 70μ according to ancestry and ploidy.
Chromosomes:	Probably all forms are apogamous with $n(= 2n)$ being 82, 123, 164, 205 and, quite possibly, 246.
Habit and Habitat:	Chiefly in west and north, some forms attaining height of over six feet. Woods, screes, walls, hillsides etc. The apogamous habit makes for uniformity of appearance in local populations, and precisely the same form can often be recognized in distant localities, e.g. N. Wales and Argyll.

N.B. This is really an aggregate of possibly four species.

—H. V. Corley

RECORDING IN PEMBROKE V.-c. 45

The unit area adopted for recording in Pembroke is the 5 km square. All records are marked on Regional Record Cards of which three examples were exhibited. Index Cards and dot maps on the 5 km square basis were shown for three species with a rather limited distribution in the county, *Genista pilosa* L., *Sarothamnus scoparius* (L.) Wimm. ex Koch subsp. *maritimus* (Rouy) Ulbr. and *Osmunda regalis* L. A dot map of a more widely distributed species, *Rubus ulmifolius* Schott, shows that in Pembrokeshire its distribution is mainly coastal. Inland, populations are usually isolated and small as well as sparsely distributed.

A map on a larger scale showed the mean minimum February isotherms and areas of carboniferous limestone with the plotted distribution of *Polypodium australe* Fée. Fourteen of the sixteen known stations are on walls in towns and villages in the limestone country of South Pembrokeshire where the mean minimum February temperature exceeds 38°F. One station lies between the 38° and 37°F. isotherms in a village outside the carboniferous limestone district though small outcrops of limestone of Ordovician age occur in the vicinity. The remaining station is in an unusual habitat, on trees (*Quercus petraea*) in woodland on the bank of the tidal Daucleddau River.

Herbarium material illustrated the difficulty of identifying *Polypodium* spp. on frond shape. A typical specimen of *P. australe* was shown beside a sheet of *P. interjectum* Shivas with fronds of almost identical form.—T. A. W. Davis.

STUDIES IN *CHRYSANTHEMUM LEUCANTHEMUM* *SENSU LATO*

Attempts to separate, in British material, the diploid *C. leucanthemum sensu stricto* from the tetraploid *C. ircutianum* Turcz. on morphological characters proved relatively unsuccessful. For our material, however, a reasonable separation was obtained using a scatter diagram of pollen size against stem leaf length divided by maximum stem leaf width. The tetraploid had larger pollen and a lower ratio of leaf length/width.

Cytology. *C. leucanthemum s.l.* occurs in Europe at ploidy levels from diploid to dodecaploid with a basic number of 9. Only diploids and tetraploids have so far been reported in Britain. B. chromosomes, euchromatic in this group, were found in the diploid ($2x = 18 + 3B$) for the first time in Europe, and also in the tetraploid for the first time in Britain. The tetraploid plant with B chromosomes shows numbers of $36 + 2B$, $36 + 3B$, and 38. The first two counts could be due to somatic non-disjunction, but we are unable to explain the count of 38 chromosomes of similar length as $36 + 2B$, since the B chromosomes are about a third of the length of the A chromosomes.—J. F. DORWARD and A. J. C. MALLOCH.

POTAMOGETON AND *GROENLANDIA* SPECIES

Herbarium specimens were exhibited of almost all the British species of *Potamogeton* and *Groenlandia* as well as several varieties of *Potamogeton*.—Miss U. K. DUNCAN.

IDENTIFICATION OF *AGROPYRON*

It is sometimes difficult to decide whether an individual is *Agropyron pungens* or *A. repens*. With this in mind the morphology of *A. junceiforme*, *A. pungens* and *A. repens* was investigated. It was found that the most convenient characters to differentiate *A. pungens* and *A. repens* were rib width and distance between ribs. *A. junceiforme* can be differentiated from *A. pungens* and *A. repens* by the distance between spikelets and the degree of overlap of the spikelets. The hybrid *A. junceiforme* × *A. pungens* can be distinguished from *A. junceiforme*, which it resembles most closely, by the fact that the rachis does not become fragile when flowering is complete.

The difficulty of separating *A. pungens* and *A. repens* may be due to wide ranges of morphological variation and inter specific variation. There is also a possibility that a third species, *A. maritimum*, morphologically intermediate between *A. repens* and and *A. pungens*, exists.—R. P. ELLIS.

STEREOPHOTOGRAPHS OF CARYOPHYLLACEAE

Stereoscopic colour photographs were shown of the indigenous species of *Silene* and *Lychnis* in their natural habitats.—J. H. FREMLIN.

FLORA OF WEST LANCASHIRE

The exhibit showed details of the organisation of the survey of the flora of West Lancashire together with results indicating the work of the first three years.

The results, collected on a 'tetrad' (2 × 2 km square) basis, showed that records had been received from about 80% of the vice-county. An average of between 100 and 150 species had been recorded from each 'tetrad' but in some over 300 species had been noted whilst in others, particularly in the east of the vice-county, less than 50 species per 'tetrad' had been found.—E. F. GREENWOOD.

HEDGEROWS

—M. Hooper

CAREX SECTION *ACUTAE*

—A. C. Jermy

CAREX STENOLEPIS—A PROBLEM SEDGE

The following points were discussed together with relevant herbarium material:

1. Is *Carex stenolepis* Less., as recorded and mapped in Britain, conspecific with the original described from N. Scandinavia?
2. The British plant described as *C. grahamii* Boott from Corrie Fee, Clova, is (always?) sterile and is intermediate between *C. saxatilis* and *C. vesicaria* on the following points:
    (I) Female glume, utricle shape and texture.
    (II) Male glume shape and colour.
    (III) Leaf morphology.
    (IV) Has some florets with 2 stigmata (as in *C. saxatilis*) and some with 3 (as in *C. vesicaria*).

    This could have arisen *de novo* in the Corrie: it is certainly an old and well established population.
3. Other populations of so called *C. grahamii* (e.g. the one on Ben nan Eachan) are more like *C. saxatilis* still, and could be hybrids with *C. vesicaria* or *rostrata*?
4. Some varieties of *C. saxatilis* e.g. var. *dichroa* (which has 2 or 3 stigmata) may well-be hybrids, more likely with *C. rostrata* than *C. vesicaria*. Studies in the field observing proximity of closely related species are needed.
5. *C. rotundata*, a Scandinavian species closely related to *C. rostrata* could occur in alpine Scotland and could introgress with *C. saxatilis*.

—A. C. Jermy

RECORDING OF THE ESSEX FLORA

—S. T. Jermyn

SOME PLANTS FROM THE HAUTES PYRÉNÉES

Herbarium specimens were exhibited of plants which had been collected in the Hautes Pyrénées around Luz-St. Sauveur during the 1966 Summer Field Course for students of Queen Mary College (University of London), since they would be of interest to B.S.B.I. members considering attending the Excursion to the Pyrenees planned for the summer of 1967.

The species were selected to illustrate the considerable phytogeographical interest of the Pyrenean flora. The western Pyrenees experience an oceanic and the eastern Pyrenees a mediterranean climate. The high mountains of the range support many species of an alpine or arctic-alpine distribution, while forming a northern limit to the range of some Iberian montane or pseudo-steppe species. The Pyrenees also possess a considerable proportion of endemic species.

Specimens of *Bartsia alpina*, *Draba incana*, *Koeleria vallesiana* and *Phleum alpinum* s.l. represented species rare in Britain but frequent in the central Pyrenees; *Eryngium bourgati* Iberio-Pyrenean species; *Petrocallis pyrenaica*, *Crepis pygmaea*, *Chrysanthemum alpinum*, *Hutchinsia alpina*, *Trifolium alpinum*, *Rhododendron ferrugineum* and *Alnus incana* represented Alpine species. The last species is not reported to be native in the Pyrenees—it is widely planted in France—but it was found away from habitation and R. M. Burton has noted it recently in somewhat similar circumstances at Gavarnie. *Carduus carlinoides*, *C. arctioides*, *Reseda glauca*, *Iris xiphioides* and *Silene brachypoda* exemplified species endemic to the Pyrenean.

Colour transparencies were displayed to illustrate the range of plant communities found in the Hautes Pyrénées. The diversity of habitats accounts for some of the abundance of species which characterises the Pyrenean flora.

—B. M. G. Jones and B. Frankland.

CONSERVATION OF THE OXLIP

—A. J. Kerr

THE FLORA OF BUCKINGHAMSHIRE

—P. Knipe

EVERGREEN ORNAMENTALS PLANTED OR NATURALISED IN THE BRITISH ISLES

Every year, the numbers of plants that are likely to be found in the British Isles are swollen by the appearance of foreign ornamental species and aliens. It is rare, even in remote areas, to spend a day in the field without coming across at least one plant of foreign origin.

The spread of foreign ornamental species into our countryside has been taking place over a great many years, although the majority have arrived during the last fifty years. The influx occurred in various ways.

1. Garden escapes and outcasts.
2. Bird-sown plants.
3. Deliberate plantings, either by private individuals or as normal policy by local or county councils and planning departments.
4. Forestry.

(1.) These species consist of plants with aggressive growth tendencies that escape either by root spread or seed dispersal, from the garden boundary and become established outside it. Also included are plants thrown out of gardens as refuse which end up on roadside verges, waste places or, via the dustbin, on to tips and rubbish dumps.

Examples in this group are many but include such plants as *Aster* spp. (Michaelmas Daisies), *Vinca major* and *Rhus typhina* (Stag's-horn Sumach).

(2.) The second category consists mainly of berried plants, in particular trees and shrubs such as *Crataegus* spp., *Cotoneaster* spp., and *Rosa* spp.

(3.) Plants in this group consist mainly of trees and shrubs planted as roadside specimens or as hedges or even in ornamental groupings. Also included are plants used in pheasant coverts or in coastal areas as wind-breaks.

Many plants are deliberately planted in wild situations by private individuals to satisfy personal whims.

Examples of this group include *Ligustrum ovalifolium* (Hedging Privet), *Prunus laurocerasus* (Cherry Laurel), *Rhododendron ponticum*, *Quercus ilex* (Evergreen Oak) and *Mahonia aquifolium.*

(4.) The last category consists mainly of trees planted in woodlands or as large organised plantings by estate owners or the Forestry Commission. The majority of these trees consist of conifers such as *Pinus* spp., *Picea* spp., *Tsuga* spp. and *Larix* spp., as well as certain deciduous groups such as *Quercus* spp.

The exhibit comprised over 90 species, varieties and cultivars of evergreen ornamental species, originating from one or other of the above sources.—C. R. LANCASTER

A SURVEY OF *CALYSTEGIA* IN THE LONDON AREA

In 1961 C. A. Stace described a method (Stace, 1961), based on a modified Anderson Hybrid Index, whereby *Calystegia sepium* and *C. silvatica* and potential hybrids between them may be easily recognised and gave an account of an experimental exercise, using this method, on populations of bindweeds in the Tunbridge Wells area. The Botany Section of the London Natural History Society adopted a suggestion made by Dr Stace that a similar exercise should be carried out on London area populations.

A five-year survey was carried out from 1962-1966 and the data amassed was analysed by the numerical method outlined in Stace's paper. Over 1,100 recording cards were processed and the distribution of the records was plotted on three maps. 66 volunteers helped to cover the large area (a circle with a 20 mile radius from St Pauls) as exhaustively as possible. An interesting feature was the discovery that the range of index values separating the species in the London populations did not conform with the range separating the Tunbridge Wells plants and plotting was modified accordingly on Stace's advice.

The exhibit showed examples, following a chronological order as far as possible, of completed record cards, instruction sheets, Progress Reports published in the *London Naturalist*, histograms, distribution maps, a table illustrating habitat analysis and a list of associated species. Much of the data accumulated during 1966 has yet to be collated and, after this has been done, a final Report will be presented in the *London Naturalist* in 1967.

REFERENCE

STACE, C. A. (1961). Some studies in *Calystegia;* Compatability and hybridisation in *C. sepium* and *C. silvatica. Watsonia*, **5**, 88-105.

—LONDON NATURAL HISTORY SOCIETY

ERICA CILIARIS IN IRELAND

A draft of a paper was on show, together with relevant specimens. These included one of J. F. Bergin's of *E. ciliaris* from Craigga More dated 1846. Others were collected by the exhibitor in the *E. ciliaris* area in Connemara and included one sheet of *E. ciliaris*, three of *E. mackaiana*, two of *E.* × *praegeri* and one of *E. tetralix*.—D. MCCLINTOCK

THE IRISH HEATHER

Seventeen sheets of *Erica hibernica* collected in early April 1966 from ten localities in Co. Mayo were exhibited. These showed a considerable range of colour and flowering time. Cuttings had been taken of several of them for cultivation. Photographs of some of the localities and plants, and a copy of a descriptive article from page 12 of the *Gardeners' Chronicle* for the 14th September 1966 were also on show. The latter gave many details and ended by referring to the change of name from *E. mediterranea* to *E. hibernica* which was subsequently published in the *Transactions of the Linnean Society* for February 1967.—D. McClintock.

VERONICA SECTION *BECCABUNGAE*

The section *Beccabungae* is clearly demarcated from the other sections of the genus *Veronica*. The five European species are herbs of marshy places and are characterised by axillary racemes of flowers.

Three of the species are in Britain and examples of each were exhibited.

V. beccabunga L. A variable plant of marshy ground, common throughout most of Britain. The diploid chromosome number $2n = 18$ has been verified on local (Cambridge) material.

V. anagallis-aquatica L. Common throughout lowland England, rare in Scotland.

V. catenata Pennell. Within the distributional range of the preceding but apparently more restricted. A vegetatively vigorous sterile hybrid is often found where the two species meet.

In addition the exhibit included two species of the section which are found in Southern Europe.

V. anagalloides Guss. Related to the two previous species, restricted to South and South East Europe.

V. montioides Boiss. A species of very restricted range, occurring in Southern Italy and Sardinia. It is apparently strictly annual, unlike the other members of the section.

—N. Marchant.

NATURAL HYBRIDIZATION IN THE BRITISH *TORMENTILLAE*

Herbarium specimens of the three British species of *Potentilla* sect. *Tormentilla*, *Potentilla reptans* L. ($2n = 28$), *P. erecta* (L.) Räusch. ($2n = 28$) and *P. anglica* Laich. ($2n = 56$) were exhibited. The two putative hybrids *P. anglica* × *P. erecta* ($2n = 42$) and *P. anglica* × *P. reptans* ($2n = 42$) were also shown. Both hybrids are markedly seed- and pollen-sterile and this affords the best means of distinguishing them from *P. anglica* with which they are easily confused.

The third possible hybrid combination, *P. erecta* × *P. reptans* ($2n = 28$), has been reported, but its identity has never been cytologically confirmed. The discovery of this tetraploid hybrid would be highly significant since *P. anglica* is believed to have originated as an amphiploid between *P. erecta* and *P. reptans*.A diagram of the comparative morphology of the three species demonstrated that *P. anglica* is intermediate in morphology between the other two.

Photomicrographs of meiosis pollen-mother-cells were exhibited. The three species have a regular meiosis, forming only bivalents, whereas the hexaploid hybrids form fourteen bivalents and fourteen univalents at first metaphase. The observed chromosome pairing in the hybrids neither confirms nor disproves the hypothetical origin of *P. anglica* since the bivalents may result from auto- or allosyndesis. A study of the meiotic behaviour of several experimental hybrids and backcross derivatives is now in progress and is expected to elucidate this point.—Miss B. Matfield.

FLORA OF RUTLAND

—G. Messenger.

A CONTEMPORARY FLORA OF CHESHIRE

This display showed, in diagrammatic form, the methods used to gather and store data relating to frequency, distribution and habitat frequencies of species found in v.c. 58. A sample of the proposed 'Flora' format was exhibited including a species list and a comment on the genus *Carex* in the County based on the investigations to date. Outline maps were exhibited showing the prevalence of characteristic habitats for correlation with the distribution of species.—A. NEWTON.

'*SYMPHYTUM* SURVEY'

The problem of identifying specimens of *Symphytum officinale* agg. was illustrated, and a scheme was announced through which members would be asked to help elucidate that problem. Simple record cards were displayed on which five simple observations might be made on six stems in a population: Corolla length, Anther length, Filament length, Corolla colour and Leaf decurrence.—F. H. PERRING.

SEXUALITY IN *TARAXACUM*

Nearly all Western European species of *Taraxacum* are apomictic and polyploid. Sexual species, probably relics, have been known for some time from a few areas, although not in Britain until this work was undertaken. Recently, Fürnkranz (1960) showed that sexual and apomictic plants occur together in some parts of Austria, and I have found populations containing diploid sexual individuals in Czechoslovakia, Poland and north-east England. They have not yet been found elsewhere in Britain, despite fairly extensive searching.

Although sexual plants are always diploid and apomictic plants are polyploid, those occurring in any one population appear identical in most morphological characteristics and belong to the same species. The species in which sexuality has been found so far are *T. polyodon* Dahlst. and *T. hamatum* Dahlst. (of the section *Vulgaria* Dahlst.) and *T. brachyglossum* Dahlst., *T. austriacum* van Soest and *T. isophyllum* van Soest (of the section *Erythrosperma* Dahlst.), but a number of other species may also be involved.

Sexual plants can often be detected by their imperfect seed-set. They have small regular pollen, while that of apomictic plants is larger and irregular or absent. Sexual plants do not set seed when flowering in an insect-proof greenhouse (they are self-sterile) or when emasculated.

The significance of this sexuality is considerable, both taxonomically, and in relation to the evolution of apomixis. As apomictic plants, *Taraxaca* have been subdivided into a very large number of species, after the manner of *Rubus* or *Hieracium*. Crossing experiments between sexual plants of different sections, and between sexual and apomictic plants (using the apomict as the male parent), have detected no breeding barriers in the genus. In a number of places in County Durham, *T. brachyglossum* Dahlst. and *T. polyodon* Dahlst., which are in different sections of the genus, occur together. For several populations, scatter diagrams have been made, using such characters as bract length, capitulum diameter and scape diameter. In four populations in which sexual individuals of *T. brachyglossum* occur, these diagrams show a hybrid swarm between the two species. In two populations where sexual plants were not found, the diagrams showed the two species to be totally separate. It seems, therefore, that hybridization is obscuring taxonomic differentiation in some *Taraxacum* populations. My thanks are due to Professor J. L. van Soest, of The Hague, for help in identifying the species concerned.

REFERENCE

Fürnkranz, D. (1960). Cytogenetische Untersuchungen on *Taraxacum* im Raume von Wien. *Öst. bot. Z.*, **107**, 310-350.

—J. Richards.

DRYOPTERIS ABBREVIATA (DC.) NEWM. WIDESPREAD IN NORTH WALES

Intensive field work over the last few years has shown that *Dryopteris abbreviata* (DC.) Newm. is widespread, but thinly scattered throughout the mountainous area of Caernarvonshire and north Merioneth. A large number of new localities for the species have been found, and up to 30th November, 1966 it has been recorded in eighty-four 1 km squares, sixty-five of them in Caernarvonshire and nineteen in Merioneth. These records extend over nineteen of the 10 km squares of the National Grid, but there is every indication that many more localities remain to be discovered. Professor P. W. Richards informs me that it is frequent in the hills behind Harlech and in the Cwm Bychan area in Merioneth. A map of the recorded occurrence of *D. abbreviata* (DC.) Newm. in North Wales was displayed.

It appears that the failure to record this species is partly due to the inadequacy of the descriptions in the Floras. The ranges of variation of some of the morphological characters used in its diagnosis have been studied, and as a result some interesting facts have emerged. For example, the number of sori per pinnule, a character often used in 'keys', has been found to be much greater than the descriptions of this species indicate. A frond from a plant attested cytologically was exhibited with up to 16 sori per pinnule.

Other features previously overlooked have been found to be of considerable value in the identification of this species: the size of the cells of the indusium, for instance, which are much smaller in *D. abbreviata* (DC.) Newm. than in *D. filix-mas* (L.) Schott. Microphotographs of the central area of the indusia of these two species were shown.

The distribution of *D. abbreviata* (DC.) Newm. is determined mainly by topography, which is closely associated with the nature of the underlying rock. Since it is restricted to open habitats on cliffs, block scree and dry stone 'facing-walls' (i.e. those with a backing of soil), it occurs most frequently where the substratum is dolerite, andesitic basalt, or other rocks which provide its special habitat requirements. On cliffs *D. abbreviata* (DC.) Newm. occupies an ecological niche shared by no other fern, but is frequently found sharing block scree with *D. borreri* Newm. In such places individual plants of intermediate affinities are often present; they have reduced fertility and are presumably hybrids. Putative hybrids of *D. abbreviata* (DC.) Newm. and *D. filix-mas* (L.) Schott have also been seen where rapid changes in soil conditions enable the two species to grow close to one another. These presumed hybrids are intermediate morphologically between the parents and have completely sterile spores. Specimens of both of the presumed hybrids were exhibited.

A fuller account is being prepared.—R. H. Roberts.

HYBRIDS OF *MIMULUS CUPREUS*

Herbarium sheets were shown of the synthesized hybrid of *Mimulus guttatus* and *M. cupreus*, as well as of specimens of the naturalised hybrid of this parentage.

—R. H. Roberts.

ERIOPHORUM GRACILE NEW TO IRELAND

The exhibit illustrated the discovery of *Eriophorum gracile* Roth at Lough Cregduff, Connemara (v.c. H16) in September 1966. This is the first certain record of the species for Ireland, as Babington's earlier one is apparently based on a specimen of *E. angustifolium*. A fuller account of this discovery will appear in the *Irish Naturalists' Journal*.—F. Rose.

FLORA OF CENTRAL WALES

—J. P. Savidge.

A FLORA OF SKYE

The exhibit showed the 5 × 5 km system in use for recording distribution, a draft for a field record card and maps of the area showing geology, altitude and rainfall. Also on view were herbarium specimens, with distribution maps, of *Eriocaulon septangulare*, *Koenigia islandica*, *Blysmus rufus* and *Sparganium minimum*.

—R. I. Sworder.

ROSES

—I. M. Vaughan.

ALCHEMILLA FAEROENSIS (LANGE) BUSER AND *A. ALPINA* L.

Alchemilla faeroensis is one of the most interesting of the apomictic species of Europe. It is easily distinguished from all other species, especially from all those of N. W. Europe, and shows a remarkable distribution, being endemic to the Faeroes and E. Iceland. It is most closely related to other members of the Section *Splendentes*, which are confined to the Pyrenees and Alps, but is both morphologically and cytologically distinct from them, with the highest chromosome number known in the Rosaceae—$2n = c.\ 220\text{-}224$. This species and other *Splendentes* have been counted by V.G.B. *A. splendens* Christ from an Alpine locality gave $2n = c.\ 163$, and *A. fulgens* Buser from the Pyrenees gave $2n = c.\ 140$.

The relationship of *Alchemilla alpina* to the *Splendentes* is a fascinating problem. The very high number of *A. faeroensis* suggests a possible hybrid origin from parents already high-polyploid. Morphologically the *Splendentes* are intermediate between the *Alpinae* (*A. alpina* L. agg.) and the *Vulgares* (*A. vulgaris* L. agg.), but the cytological investigation of both these groups is very incomplete.

There is a further interesting problem in the Faeroese *A. alpina*. Some of the plants collected on Vaagö in June 1966 have remarkably joined leaflets, and the chromosome number of one of these proves to be $2n = c.\ 152$, a higher number than any previously recorded for this species ($2n = c.\ 120\text{-}140$ on Scandinavian and Alpine material). Variation within Northern European *A. alpina*, already described by Turesson (1958) clearly needs much closer investigation.

REFERENCE

Turesson, G. (1958). Observations on some clones and clone progenies in *Alchemilla alpina* L. *Bot. notiser.*, **111**, 159-164.

—S. M. Walters and V. G. Boznan

JUNCUS NODULOSUS VAR. *MARSHALLII*

The exhibit concerned the rediscovery in October 1966 of *Juncus nodulosus* var. *marshallii* growing plentifully in the original locality at the wet, stony margin of a loch in Sutherland (v.c. 107).—Miss M. McC. **Webster.**

SOME PLANTS FROM COLORADO AND ARIZONA

The exhibit consisted of colour photographs of various wild plants growing in their natural habitat in Colorado, Arizona and New Mexico. They were taken by the exhibitor in August and September 1966.—L. S. **Whicher.**

NOTEBOOKS OF HEREFORDSHIRE PLANT RECORDS

—Mrs L. E. **Whitehead.**

THE FLORA OF SURREY

Recording for the new Flora started in 1957, under a Flora Committee of initially five members, which was later expanded to eight. Existing data was sufficient to establish that some species were widely distributed throughout the county. It was felt that these did not need further investigation and could be omitted from recording. Accordingly, a recording card was printed with a selected list of 460 species.

Examples of recording cards were shown, also individual record slips used for collecting amplified data for rare, unusual, or critical species. These slips are also useful for supplying advice to conservation organisations.

The grid for recording is the now usual 2 × 2 km 'tetrad'. A base-map was prepared and some examples of recorded distributions plotted on this were shown.

Field work for the Flora has just terminated as sufficient records have been collected.—D. P. **Young.**

FLORA OF HAMPSHIRE

This was a small exhibit of maps showing the progress made in the work of this revised 'Flora', and the methods being used. Work on the 'Flora' was started by the late A. W. Westrup, who bequeathed his material to the Hampshire and Isle of Wight Naturalists' Trust. They have entrusted the work to Mrs M. P. Yule, who is carrying out the recording with the help of a small committee.—Mrs M. P. **Yule.**

SOME RECENT PUBLICATIONS BY MEMBERS

From 4.15 pm the following members gave short lectures and showed colour slides in the Lecture Hall.

Mrs A. N. **Gibby**	Some Botanic Gardens.
B. M. G. **Jones**	Some Plants of the Pyrenees around Gavarnie.
G. S. **Phillips**	British Orobanchaceae.
G. **Duckett**	*Equisetum.*
R. **Sibson**	Some Native Orchids.
H. J. **Birks**	Scottish Plants.

REPORTS

REPORT OF THE COUNCIL FOR 1966

The report and audited accounts cover the period from 1st January to 31st December, 1966. Figures in brackets are the comparative figures for 1965.

During the year 122 (135) new members joined the Society and we lost 98 (77) by reason of death, resignation and the operation of Rule 28. The total membership at the end of the year was 1,676 (1,652) with a net gain of 24 (58). We record with great regret the death, whilst in office, of our President, Dr E. F. Warburg, and also of Dr F. R. Elliston Wright, a member for forty years. It was decided to continue the administration of the Society's affairs without electing a President until this Annual General Meeting. Dr C. E. Hubbard, the senior Vice-President, agreed to officiate at Council and at other meetings when necessary,

The accounts of the Society for the year 1966 are appended. Income from subscriptions has changed very little compared with the previous year, but interest receipts and proceeds from the sale of journals each show an increase. The debit for the cost of printing and distributing journals is about £300 more than in 1965, but even so represents substantially less than the full cost of issuing two parts each of *Watsonia* and *Proceedings*. The surplus for the year, amounting to over £800, is, therefore, once again largely due to the fact that less than two parts of each of our periodicals have been issued.

Elsewhere in the report brief reference is made to the various and increasing activities of the Society. These activities call for much work on the part of the Officers, Committee Secretaries and others, and it is due to their voluntary sacrifice of time (and often 'materials' as well) that the expenses of administering the Society have been restricted to less than £500; indeed our administrative expenses are no higher than they were four or five years ago. It is not surprising, therefore, that in an active and growing Society such as ours, the burdens placed upon the Honorary Officers are becoming intolerable and it has been decided by Council that a small part of the routine work of some of the most hardly pressed Officers shall be taken over by the Institute of Biology. This will add to our administrative costs, but it is an inevitable step in the progress of the Society, which, in the longer term, must benefit from the opportunity to make better use of the available time of its Officers. The increased expenses which we must anticipate will be such that unless there is a steady increase in membership, it may be soon necessary to consider increasing the annual subscription, which has remained unchanged since 1957.

Transactions on the Publications Fund are relatively small. One reason for this is because our last Conference Report, *Reproductive Biology and Taxonomy of Vascular Plants*, was published for the Society by Pergamon Press Limited. The whole cost of printing and distributing this book has, therefore, been borne by Pergamon and we hope to receive in due course a small sum by way of royalties on sales in excess of a stipulated minimum. According to the success or otherwise of this arrangement the Society will decide whether to handle other of its publications in this manner.

The fight to save Upper Teesdale has been intensified during the year and a report on the continued opposition to the building of a reservoir at Cow Green, organised by the Teesdale Defence Committee, is appended on page 89.

THE MEETINGS COMMITTEE arranged in April the Annual General Meeting in conjunction with a meeting of the South-East Region, at the Jodrell Lecture, Royal Botanic Gardens Kew by kind permission of the Director. A series of lectures was arranged and tours were conducted round the Jodrell Laboratory, the Herbarium and Library and the Gardens 80 (117) members and friends attended. The Committee also organised the Annual Exhibition Meeting in November at the Department of Botany, British Museum (Natural History), by kind permission of the Keeper of Botany, Mr R. Ross. Thirty-six (26) exhibits were staged and about 70 (70) members and friends attended the Reception held later in the Conversazione Room. Field meetings, at which the total attendance was 80 (160), were arranged for Windsor, Berks.; Mid-Swaledale, Yorks.; Ranmore Common and Polesden Lacey, Surrey, for the study of grasses; Nantwich, Cheshire; Staffs. for the study of brambles; Crewkerne, Somerset; Horsham, Sussex, and Andover, Hants. Owing to poor support a number of these had to be cancelled and the Committee has decided to hold fewer meetings in the coming season. The Welsh Regional Committee organised meetings at Moelfre Harbour, Anglesey; Newcastle Emlyn, Cards.; Ddol, Flint; Aberystwyth, Cards.; and the Irish Regional Committee at the Burren, Co. Clare. A most successful Conference, attended by 70 members, for Local Flora writers was held at Bristol University. A Conference on 'Modern Methods in Taxonomy' is being arranged for September, 1967, at Liverpool University.

THE JUNIOR ACTIVITIES COMMITTEE was convened by the Field Secretary, in the continuing absence of a Committee Secretary. Field meetings were arranged for the Lizard, Cornwall; Waldridge Fell, Durham; Cothill, Oxon.; Calthorpe Broad, Norfolk, and Arnside, Westmorland; but again not all were held owing to lack of support. Educational aspects of the Society's activities were considered but it was felt that no serious policy could be developed until a secretary to the Committee was found; it is hoped to convene a meeting early in 1967 to discuss these matters further. Miss Ailsa Burns has kindly volunteered to co-ordinate the applications for junior field meetings in 1967.

Amendments to the *Rules*, as published in 1964, proposed at the last Annual General Meeting, were accepted and the **Development and Rules Committee** has been responsible for preparing an amended edition accordingly. The most important changes have been to abolish the offices of Junior Activities Secretary and all District Secretaries and to incorporate the new Records Committee. The *Schedules* appended to the *Rules* have also been revised to bring terms of reference of Permanent Committees up-to-date. The revision of the Society's *Prospectus*, now well out-of-date, is also being undertaken. A special sub-committee was set up to explore the possibilities of the Society undertaking a regular programme of 'network research'; a report on this, outlining a number of possible schemes, was submitted to Council, who approved the project in principle.

THE PUBLICATIONS COMMITTEE has been very seriously concerned with the question of ensuring that our periodical journals are published on schedule. Only one part each of *Watsonia* and *Proceedings* appeared in 1966. The new editor of *Proceedings* has been given full support in his endeavours to bring his publication out on time and a board of three Editors has been appointed to improve policy with regard to *Watsonia*. The Committee also considered the publication of a bibliography of monographs of British genera compiled by D. H. Kent. Conference Report No. 9 referred to earlier in this Report, edited by J. G. Hawkes, was published during the year, and progress was made on the handbook of British species of *Carex*, under the joint authorship of T. G. Tutin and A. C. Jermy; publication of the latter work is envisaged in 1967. The suggested combined edition of the *Comital Flora* and the *List of British Vascular Plants* is still under active consideration. The thanks of the Society are again due to Mr Kent for handling all orders for our publications.

THE CONSERVATION COMMITTEE has continued its active investigation of many threats to the British flora; in particular the support of Council was sought to the opposition organised by the Yorkshire Naturalists' Trust to a threat to Askham Bog. Support was also given to the work of the Wild Plant Preservation Working Party in preparing a Bill, to be submitted to Parliament, for the protection of wild plants. Liaison meetings between the Society and the Nature Conservancy continued to be held.

THE RECORD COMMITTEE was set up, as a permanent committee of Council, to replace two former special committees, **Local Floras** and **Maps.** Under its terms of reference it becomes responsible for encouraging members to record the British flora as efficiently as possible, and with this in view recommended the purchase of record cards and index drawers (to remain the Society's property) to be available to Recorders of counties with no adequate system as yet. The Committee also recommended the investment in six film-strips of maps showing vice-county boundaries, one strip available for loan and the surplus for sale. These recommendations were accepted. The new Committee in addition took over the responsibility from the Development and Rules Committee for keeping up-to-date the *Panel of Referees and Specialists* and *Local Organisation: District Secretaries and Recorders*; revised editions of these have been prepared for publication in *Proceedings.* A revised and expanded edition of his paper on 'Hints on the determination of critical species' is being prepared by F. H. Perring, who also reports that the Supplement to the *Atlas of the British Flora* is expected in the autumn of 1967. An investigation is also being carried out into the possibility of producing a census catalogue of British flowering plants.

THE COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA arranged a full and interesting programme of field meetings, including two of a week's duration, one to the Isle of Skye and the other to the Cairngorms. Shorter meetings were to: Ardrishaig, Argyll; Campsie Fells, Stirling, and Glenbeich, Perth. Full accounts of the work of this Committee, THE IRISH REGIONAL COMMITTEE and THE WELSH REGIONAL COMMITTEE will appear in their annual reports to be published in *Proceedings.*

The Council thanks the many friends of the Society who have helped in various ways to further its progress and also those members who have taken an active part in organising its activities on committees, as representatives on other bodies and in other ways. In particular, thanks must be expressed to the authorities of the University of Bristol for allowing a Conference to be held there; to University College, London, the Nature Conservancy and to the Linnean Society of London for allowing various committee meetings to be held in their premises; to the University College of Wales, Aberystwyth; and the University of Glasgow for allowing regional meetings to take place there; to the Trustees of the British Museum (Natural History) for the use of their Conversazione Room and Lecture Hall for meetings following the Annual Exhibition Meeting. Finally we thank our Honorary Auditors, Messrs Price Waterhouse & Co, for their continued services.

E. B. BANGERTER, *General Secretary.*

February, 1967.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December, 1966

1965			
	Cost of Printing and Distributing:		
	Proceedings, Vol. VI, Part 3, and provision for Part 4	£744 19 10	
	Watsonia Vol VI, Part 4, (balance) and provision for Part 5,	1,100 13 6	
£1,562			£1,845 13 4
171	Printing Annual Report and Notices of Meetings		161 18 8
47	Expenses of Council and Committee Meetings		57 17 6
194	General printing stationery, postages, telephone and petty expenses		181 0 10
28	Expenses of Regional Organisation		15 11 10
37	Field and Indoor Meetings expenses less fees received		62 13 6
878	Excess of income over expenditure credited to General Fund		865 9 2
£2,917			£3,190 4 10

1965			
£2,285	Subscriptions received		£2,352 3 2
351	Interest received		399 7 0
	Proceeds from Sales:		
	Proceedings	£102 13 10	
	Watsonia	296 0 10	
	Old B.E.C. Reports	40 0 0	
281			438 14 8
£2,917			£3,190 4 10

PUBLICATIONS FUND

Transactions in 1966

1965			
	Conference Reports, Preparation of index for Report No. 9		£6 6 0
	Balance to 1967:		
	General	£1,791 12 3	
	Atlas Royalties less outgoings,	1,623 2 6	
£3,278			3,414 14 9
£3,278			£3,421 0 9

1965			
£3,042	Balance from 1965		£3,278 11 6
	Sales:		
110	*Conference Reports*	£45 4 2	
37	Other Publications	12 19 10	
			58 4 0
89	Royalties received on *Atlas of the British Flora*		84 5 3
£3,278			£3,421 0 9

BALANCE SHEET AS AT 31ST DECEMBER 1966

1965			
	General Fund:		
	Balance 1st January 1966	£3,185 7 8	
	Add: Premium on conversion of Defence Bonds	7 10 0	
	Excess of income over expenditure for year	865 9 2	
£3,185			£4,058 6 10
3,279	Publications Fund		3,414 14 9
40	Benevolent Fund		39 11 0
1,354	Creditors for Printing and General Expenses		1,049 4 0
159	Subscriptions Received in Advance		95 0 0
£8,017			£8,656 16 7

1965			
	Investments:		
	40% Defence Bonds	£1,000 0 0	
	5% Defence Bonds	3,000 0 0	
	5% National Development Bonds	1,000 0 0	
£5,000			£5,000 0 0
	Cash at Bank:		
	Deposit Account	£3,500 0 0	
	Current Account	156 16 7	
3,017			3,656 16 7
£8,017			£8,656 16 7

J. C. GARDINER,
Hon. Treasurer.

Audited and found correct.
31st January, 1967.

PRICE WATERHOUSE & CO.,
Hon Auditors.

TEESDALE DEFENCE COMMITTEE

INTERIM REPORT

Most members will be aware of the present position in the 'battle of Cow Green'. After a lengthy hearing before a Select Committee of the House of Commons, the Bill promoted by the Tees Valley & Cleveland Water Board was debated in the House and passed by the relatively narrow majority of 112-82. It therefore became necessary to continue the opposition to the Bill in the House of Lords. In order to assist with the large amount of work involved, which included further appeals for funds, the lobbying of a very large proportion of all the members of the Upper House, press and other forms of publicity and preparations for another lengthy hearing before a Parliamentary Select Committee, it was decided to expand the Committee to include the Society for the Promotion of Nature Reserves, the Council for Nature and the three County Naturalists' Trusts most affected by the reservoir proposals.

At the time of writing this report (mid-February 1967), after a hearing lasting 19 days extending from 22nd November, 1966 until 24th January, 1967, the Select Committee of the House of Lords announced that, in their opinion, the reservoir Bill should be allowed to proceed; this was confirmed in their subsequent Special Report dated 6th February, 1967. The likelihood of the Bill now being rejected by the full House of Lords is, therefore, remote. As soon as possible after the Parliamentary proceedings have been concluded a further report and a full statement of the Defence Committee's accounts will be issued.

J. C. Gardiner, *Hon. Treasurer.*

22nd February, 1967.

IRISH REGION REPORT FOR 1966

The main activity during the year was the Summer Field Meeting in the Burren, Co. Clare with an attendance of 22. Detailed recording was done at 26 sites for the projected 'Flora of Connemara and the Burren'.

At the Annual General Meeting held in October a number of short papers were read. Two were mainly historical:- Dr M. Mitchell outlined the history of Lichenology in Ireland and Professor D. A. Webb spoke on the life and achievements of the Irish Algologist, Harvey, who died in 1866.

Miss M. Scannell reported on recent additions to the Irish Flora and Fr J. J. Moore spoke on the ecological behaviour of some Irish plants.

Professor Webb also summarised the progress made to date on the 'Flora of Connemara and the Burren' project.

Work is also being carried out on a Flora of Co. Armagh (Belfast and Armagh Field Clubs) and of Co. Carlow.

Present Irish Membership stands at 31 + 4 subscriber members.—J. J. Moore, s.j.

WELSH REGION REPORT FOR 1965-1966

The past year has not been a very encouraging one from the point of view of membership. We have had 7 resignations, 6 in January and 1 in June. Some are due to removals from Wales and some may possibly be due to people concentrating their interests and affinities on their own County Naturalists' Trusts. We have gained 3 new members.

The *Welsh Regional Bulletin* has appeared in March and in September, the latest issue being mainly concerned with the Flora of Central Wales. This project will obviously have very timely significance now that areas of Central Wales may be included in a new National Park and still more so because attention is focussed on Central Wales as an area for National Recreation.

The other main project for Plant Distribution is making progress but in both cases there is room for more workers to provide local data: more reports from individual botanists are required and writers of the various sections would welcome offers of help. Eight members from the Welsh Region attended the Local Flora Writers Conference at Bristol on September 17-18.

Mr May's 'Flora of Carmarthenshire' has been accepted for publication by the West Wales Naturalists' Trust, with the aid of a grant from the County Education Authorities.

A branch of the West Wales Naturalists' Trust has been launched in Carmarthenshire; its botanical interests need development.

All Naturalists' Trusts in Wales have been circularised on the subject of the Registration of Common Land which is due to begin in January next.

Five Field Meetings have been held; one 2 day meeting and 4 single days: the last, at Stanner Rocks was in conjunction with the Hereford Naturalists' Trust. These meetings were only moderately well attended but in each case some English members were also present.

A new serious menace to botanical interests in Wales is the construction of a road through the classic area of Kenfig Dunes for conveyance of materials for the new Port Talbot Docks. This was strongly opposed by the Council for the Preservation of Rural Wales and by the Nature Conservancy. Protest from the Conservation Committee of the Botanical Society of the British Isles was sought immediately on information received but, unfortunately before this could take shape the Glamorgan County Council had conceded permission.

The threat to submerge the Upper Town Valley still impends.—I. M. VAUGHAN.

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA: TWELFTH ANNUAL REPORT TO 31st DECEMBER 1966

The Committee met twice, each time in Perth, and an Exhibition meeting was held jointly with the Andersonian Naturalists of Glasgow, on Saturday, 12th November, at the Department of Botany, University of Glasgow, by kind permission of Professor P. W. Brian.

Five Field Meetings were held—Ardrishaig, June 11th-12th, led by Mr A. G. Kenneth (5); Isle of Skye, June 18th-25th, led by Mr A. McG. Stirling (7); Campsie Fells, 18th June, led by Mr E. C. D. Todd (9); Glenbeich, July 3rd, led by Mr A. W. Robson (11), and the Cairngorms, July 16th-23rd, led by Mr A. Slack (19-25). The figures in brackets are the numbers of people attending each meeting.

The Exhibition meeting was attended by about 70 people of whom about 50 were present for the evening session. Mr Oldham, Director of Parks for Glasgow, gave a most interesting and stimulating talk on 'Landscape Conservation' which was illustrated by delightful colour transparencies. The following exhibits were shown:

Alien Plants	Miss E. P. BEATTIE
Sublittoral algae of the coast of Argyll	E. CONWAY
Flowers found this Summer (Mainly *Cruciferae*)	Mrs CROSS
Species of *Zostera* and of *Mentha*	Miss U. K. DUNCAN
Alisma lanceolatum, v.c. 98; *Ranunculus auricomus*, v.c. 98; *Hieracium* spp. v.c. 101 and 108.	A. G. KENNETH
The Preparation of Floras.	Miss J. LAMOND—(Royal Botanic Garden)

Demonstration of lichens, ferns and flowering plants and living plants of *Deschampsia alpina*.	H. McAllister
Polygonum oxyspermum and *P. raii* in Scotland.	Miss C. W. Muirhead
Live material of *Senecio* species—*S. viscosus*, *S. sylvaticus*, *S. squalidus*, *S. vulgaris* var. *radiatus*.	R. Prasher
Plants from the Lanark square.	W. A. Scott
Saxifraga cespitosa in Scotland and New and interesting Scottish plant records.	A. McG. Stirling
Plants seen on the 1966 Field-Meeting to the Campsie Hills	E. C. D. Todd
Peloric form of *Corallorhiza trifida* (photograph); New County records from Moray..	Miss M. McC. Webster
Juncus nodulosus var. *marshallii* from Loch Ussie.	
Grasses from Central Africa.	
Grain and Wool Aliens.	

During the evening slides were shown:

Alien Plants.	Miss E. P. Beattie
Field Meetings in Skye (June 1966) and in the Cairngorms (July 1966); Noteworthy plants from the Ben Alder district.	A. McG. Stirling
Flowers from high altitudes.	Mrs Cross
Parasitic and saprophytic plants.	A. A. Slack

Although the composition of the Committee remained the same as for the previous year, the duties of some of the members changed. At the request of the Secretary, Dr D. Ratcliffe, at the March meeting, a Treasurer was appointed:- Dr N. Pritchard, kindly volunteered to take on the office of Treasurer. Soon afterwards, however, he was seconded to Malaya for one year. At the October meeting Dr Ratcliff intimated his resignation as he was moving south. Miss Beattie offered to combine the duties of Secretary and Field Secretary for the trial period of one year, while Mrs Sommerville agreed to act as Treasurer during the absence abroad of Dr Pritchard. The meeting deputed the Chairman to convey to Dr Ratcliffe the gratitude of members for his work for the Committee, and their best wishes for his success and happiness in his new post.

One foreign meeting, one week meeting, two long weekend meetings, seven weekend meetings and five day meetings were arranged for 1967; a number of these will be in conjunction with branches of the Scottish Wildlife Trust.

It is a pleasure to express thanks to the officers of the B.S.B.I. and B.S.E., and to all those who have generously given of their free time to help the Committee to carry out its activities.—E. P. Beattie.

FIELD MEETING

NORWAY AUGUST 1963

Leader: R. Mackechnie

The following account of a field meeting in Norway was unfortunately mislaid but in view of the importance and interest of the meeting it has been decided to publish it at this late date.—**Ed.**

The decision taken by the Committee for the study of the Scottish Flora, to make Norway the venue of its 1963 field meeting, was prompted by two main considerations. One was the interest which British botanists generally exhibit in boreal landscapes and their vegetation; the other, and more particular, one was the addition during recent years of the three northern species *Diapensia lapponica*, *Artemisia norvegica* and *Koenigia islandica* to the Scottish flora. Whatever misgivings may have existed in some quarters as to the propriety of this venture, it was soon obvious that these were not shared by all Society members; an embarrassingly large number greeted the proposition with enthusiasm and we had, regretfully, to turn down some of the later applicants. Unforeseeable circumstances compelled one or two eleventh-hour cancellations, and in the end a party of 20 assembled in Oslo on the morning of 5th August.

A good deal of consideration and much correspondence had preceded the final choice of route. The numerous botanical friends, most of them Society members, who helped at this stage by suggesting places to visit and people to contact, deserve our warm thanks. Through them useful contacts with Norwegian botanists were established, and so the field of enquiry was widened. The original plan, to divide our time between the mountains of Trollheimen and the west coast in the Romsdal district, was by degrees modified as we learned that south-eastern Norway had an interesting flora of Mediterranean affinity; that the vegetation of Norway's western coast was very much similar to that of Scottish shores, and that to botanise in Norway without spending a day or two at Kongsvoll in the Dovrefjeld would be equivalent to omitting Lawers from a Scottish tour. It will be apparent from what follows that the programme finally adopted differed considerably from that originally considered; there was obviously so much to be seen that making the final choice was not easy but, as one of my Norwegian correspondents rather tartly observed; 'In a fortnight one cannot see everything!'

For the sea-borne members of the party there was a first brief contact with Norwegian soil when their boat put in at Kristiansand on the way into Oslo fjord; in the short time available ashore some had their first look at *Silene rupestris* and *Berteroa incana*. But after a day and two nights at sea a visit to Oslo's Botanic Garden in the afternoon of 5th August made a pleasant introduction to Norway's plants. The Garden is compact and nicely planned; it is closely linked with the teaching of botany in the University of Oslo and with Professor Rolf Nordhagen. One of his assistants, Mr Per Sunding, acted as guide; we, of course, were chiefly interested in the order beds, where we were introduced to some of the plants which we hoped to meet again later in the meeting. The other feature which attracted attention was a section of the Garden set aside for exotics which had proved to be well-suited to Oslo's climate; by having these on display it was hoped to encourage local amateurs to introduce them to their own gardens.

The following morning, again under Per Sunding's guidance, we set off from the water-front for Ostoen Island; scarcely a square mile in area, Ostoen is one of a number of islands in Oslo fjord, close to the city and easily accessible by water-bus. It is a rocky island, the main constituents being apparently schist and chalk. We disembarked at a jetty and close by, in an area of outcropping rock, we listed the following plants:

Alchemilla glaucescens
Artemisia campestris
Asplenium septentrionale
Cakile maritima
Calamagrostis arundinacea
Centaurea jacea
Cotoneaster integerrimus
Dracocephalum ruyschiana
Lepidium ruderale
Luzula spicata
Picea abies
Pinus sylvestris
Poa alpina
P. compressa
Polygonatum odoratum
Potentilla argentea
Scleranthus perennis
Seseli libanotis
Silene nutans
Veronica spicata
Woodsia alpina

Associated with them were other, more familiar, species, but the list illustrates well enough a feature of botanising in Norway which caused surprise at first; but which we soon learned to accept as normal—the association in a single habitat of species which, in Britain, we had come to regard as differing widely in their ecological needs.

A small salt-marsh not far from the jetty yielded *Polygonum kitaibelianum*, looking remarkably like a *Statice*, and while walking across the island we added to the list: *Actaea spicata*, *Campanula persicifolia*, *C. trachelium*, *Carlina vulgaris*, *Dianthus deltoides*, *Heracleum sibiricum*, *Lathyrus niger*, *Lonicera xylosteum*, *Melampyrum sylvaticum*, *Phleum phleoides*, *Rubus saxatilis* (fruiting abundantly), *Sambucus racemosa*, *Viola collina* and *V. mirabilis*. When we reached the shore on the other side there were further additions: *Ajuga pyramidalis*, *Alnus incana*, *Artemisia absinthium*, *Calamagrostis epigejos*, *Carex paleacea*, *Epipactis atrorubens*, *Ononis hircina*, *Sorbus hybrida*, *Stellaria crassifolia* and *Woodsia ilvensis*. The total species list for this eventful day was over 170; it included such botanical paradoxes as glabrous *Arabis hirsuta* and immaculate *Hypochoeris maculata*, and not the least of its surprises was the realization, in retrospect, that many of our own commonest plants were missing; the list lacked *Deschampsia flexuosa* for example, and contained no species of *Anthoxanthum*, *Arrhenatherum* or *Holcus*.

Back at the city centre in the early evening a few of the more energetic promptly set off—again by water bus—on a visit to the famous Museums at Bygdoy; in Oslo there is much to see, and we had little time to spare for it.

When Per Sunding arrived next morning he had with him Professor Nordhagen, and we had their company and direction during the day; we spent it on the hill Krokkleiva, which lies about 30 miles north-west of Oslo along a good road. On the way a halt was made at a vantage point, to admire the fine view across Tyrifjord Lake and Ringerike to Hönefess and the Norefjell mountains; for us the prospect was enhanced by the presence of *Lathyrus sylvestris* and *Berteroa incana* in the foreground. At Sundvollen the ascent of Krokkleiva was undertaken, majestically, by chair-lift; the upper terminus, Kleivstua, is just over 1,000 ft, and from there a short walk brought us to the 'King's View', an even more splendid panorama across Ringerike. I shall always remember that walk; it brought an impression that was to return often during our stay in Norway, of being in Scotland. The path led by a streamside; on the one hand was a spruce forest, which could have been Forestry Commission (it was, of course, the native *Picea abies*), and on the other the rocky stream-bed with rough open country beyond; the combined effect could be matched often enough on the lower slopes of the Perthshire hills. But here the tall ferns at the wood edge were not Male Fern but Ostrich Fern, *Matteuccia struthiopteris*, and patches of yellow-flowered *Aconitum septentrionale* replaced the familiar groups of Foxglove. After lunch we set off for Sundvollen on foot, down a rough, stony track; beautiful flowering rosettes of *Saxifraga cotyledon*, growing from the wet rock, and a fine clump of flowering *Linnaea borealis* brought from the adjacent woodland were the highlights of the afternoon. The entire journey was no longer than a mile, but it served to underline what Ostoen Island had demonstrated—our British conception of mountain and woodland species meant little here. In this short distance, and growing practically side by side, we met with *Cicerbita alpina*, *Lycopodium annotinum*, *Phleum commutatum*, *Poa alpina* and *Potentilla crantzii* as well as *Actaea spicata*, *Carex flava*, *Daphne mezereum*, *Equisetum pratense*, *Impatiens noli-tangere* and *Paris quadrifolia*.

At Sundvollen we took leave of Per Sunding, who had piloted us so successfully during these two days; the following morning we made an early start on our longest day's journey—250 miles northward, on the Trondheim road, to Kongsvoll in the Dovrefjeld. There was drizzling rain, and mist lay in the hollows of the fields just north of Oslo; this was arable land, with ripening barley much in evidence, but potatoes, wheat and oats were also widely grown. Spindly hay-driers had been erected in many of the fields; the brightly painted houses along the way lightened the greyness of the morning. Our road contoured a wooded slope above the west shore of Norway's largest lake, Mjosa; *Matteuccia* and *Aconitum septentrionale* grew among the trees, with *Impatiens noli-tangere* and *Polygonatum verticillatum*. After a short stop at Gjovik, some 80 miles north of Oslo, we crossed the lake bridge at Vingones and continued through Lillehammer to Oyer. Then, following a hint from Professor Nordhagen, we recrossed the lake (here little more than a river) and made a halt in some pleasant woodland; the elegant grass *Cinna latifolia* was soon located, with *Circaea alpina*, *Potentilla norvegica* and some very large *Woodsia alpina* close by.

Returning to the east bank at Tretten, we were now fairly in the Gudbrandsdalen, the long valley extending for 120 miles to the mountains of Dovre. This narrow strath, flanked by sloping hillsides clothed with forests of pine, spruce and birch, was cultivated wherever the ground was not too rocky or too steep, from saeters or hill-farms. North of Dombas, and across the watershed, we were among the head-streams of the north-flowing Driva River. This was an eerie, tundra-like countryside, unlike anything that most of us had seen before; the prevailing grey of rocks, lichens and waist-high willows gave the landscape a remote, almost hostile atmosphere. One could imagine that, for the solitary traveller on foot here, an occasional glance over the shoulder would become compulsive; he could only hope that the natives, undoubtedly the trolls (or their even more sinister, though less familiar female counterparts, the hulder) would be friendly.

In the evening, with Trondheim still 100 miles ahead, we came to Kongsvoll; here, at 2,910 ft in the upper Driva valley, the fjellstue (mountain inn) was to be our home for the next two days, and awaiting us were Dr Per Wendelbo, from the Department of Botany at Bergen, with Arne Rosvik, an honours student. In this remote place a railway seems as improbable as in the Pass of Drumochter; in fact, the main Oslo-Trondheim road and rail routes go through this valley, although at Kongsvoll there are few buildings apart from station offices. Our train party was already in residence, and one by one the cars arrived; the one transporting Professor Nordhagen contained also a living plant of the rare fern *Athyrium crenatum*, saved from destruction at a road-widening on the way (and, I believe, still flourishing in a pot in Aberdeen), and some specimens of *Calamagrostis lapponica*.

Kongsvoll owes its botanical interest to the great variety of arctic plant life on the innocent-looking Knutshø hills, at the base of which it lies. As with Ben Lawers, the ascent of the Knutshøs is gentle; the rewards are rich. Our first full day there will always be memorable for the large number of new plants we saw. Close to the hotel, in the pastures and by the roadside, we had on the previous evening seen enough to realise that we had come to a district of exceptional richness, yet we were scarcely prepared for the disclosures of the next day. Ascending Knutshø from just behind the inn, the list of noteworthy species encountered speaks for itself:-

Agropyron latiglume
Agrostis borealis
Anemone vernalis
Antennaria alpina
Arabis alpina
Angelica archangelica
Artemisia norvegica
Astragalus frigidus
A. norvegicus
Bartsia alpina
Botrychium boreale
Calamagrostis neglecta
Cardamine bellidifolia
Carex atrata
C. atrofusca
C. capitata
C. lachenalii
C. norvegica
C. parallela
C. saxatilis
C. vaginata
Cassiope hypnoides
Chamorchis alpina
Deschampsia alpina
Diapensia lapponica
Draba alpina
Dryas octopetala
Epilobium davuricum
E. hornemanni
Equisetum scirpoides
Erigeron boreale
Eriophorum scheuchzeri
Gnaphalium norvegicum
Juncus arcticus

Kobresia myosuroides
Koenigia islandica
Melandrium apetalum
Minuartia rubella
Oxytropis lapponica
Pedicularis oederi
Petasites frigidus
Phippsia algida
Phleum commutatum
Phyllodoce coerulea
Poa alpina
P. stricta
Primula scandinavica
Ranunculus glacialis
R. hyperboreus
Sagina caespitosa
Salix arbuscula
S. glauca
S. hastata
S. lanata
S. lapponum
S. myrsinites
S. polaris
S. reticulata
Saxifrage adscendens
S. cernua
S. caespitosa
S. rivularis
Stellaria calycantha
Taraxacum dovrense
Trisetum spicatum
Veronica alpina
V. fruticans
Viscaria alpina

All this was set against a background of more familiar species of the Scottish mountains, including *Saxifraga aizoides* in three colour forms, yellow, orange and deep red.

With so much to see, including the lemmings on the lower slopes, we moved slowly; by late afternoon we were at about 5,000 ft, and still a little way below the col linking the middle and southern Knutshø summits. Now, deteriorating weather turned us homeward; after such a surfeit of novelties there were no complaints. That evening at Kongsvoll was a social occasion. Professor Nordhagen demonstrated, to our delighted surprise, that if his destiny had not led him to world-eminence as a botanist, he would surely have attained equal renown in a very different field. Our host, Per Holaker, exhibited transparencies illustrating the plants and scenery of the Dovrefjeld, and some of the scenes at Kongsvoll in the deer-hunting season; luckily for us, Allan Stirling had had the foresight to bring some of his own Scottish slides, so we were not entirely on the receiving end.

On the following morning the party divided into two groups. Dr Wendelbo and Arne Rosvik, with six others, made for the northern Knutshø; the weather was not ideal, but they added *Campanula uniflora*, *Luzula arctica*, *L. parviflora*, *Phippsia concinna*, *Poa arctica*, *P. flexuosa* and *Stellaria crassipes* to the previous day's list. The rest of us accompanied Professor Nordhagen to a side-valley of the Driva north of Kongsvoll. A short stop on the way allowed us to admire one of the small but beautiful arctic poppies, *Papaver radicatum*, growing with *Artemisia norvegica* and *Arabis alpina* on the stony river-bank by the main road. To the east of the road a strip of lush woodland gave the Professor an opportunity to demonstrate a standard Norwegian woodland association, comprising *Ranunculus platanifolius*, *Milium effusum* and *Cicerbita alpina* (here 6 ft high); with them, and *Primula scandinavica*, were *Cystopteris montana* and *Saxifraga nivalis*—and *Chrysanthumum vulgare*! We had long ceased to wonder at these apparent incongruities.

The glen in which we were to spend the day lay to the east of the main Driva valley, and followed an almost parallel course; access was by a rough, winding road on which progress was slow, but at least we had it to ourselves. The flora, while scarcely as rich as that on Knutshø, contained many of the plants seen the previous day and indeed provided a few additions, among them *Draba daurica*. At every stop, and there were several, so much of interest surrounded us that we were reluctant to move on; there was a general feeling that several days could have been spent exploring this attractive valley. The climax of the day undoubtedly came at the last stop, made at a high saeter near the head of the glen; here, beside a small lake, were *Calamagrostis neglecta*, *Cardamine nymanii* (a segregate of *C. pratensis* with adventitious shoots on the leaves), *Cerastium cerastoides*, *Epilobium hornemanni*, *E. anagallidifolium*, *Eriophorum scheuchzeri*, large quantities of *Koenigia*, flowering stems of *Saxifraga cernua* about a foot high and, for company, *Cerastium fontanum* subsp. *triviale* and *Stellaria nemorum*! To provide a final touch of the bizarre, the turf of the saeter had a lush and varied flora of its own, in which *Cerastium alpinum*, *Draba daurica*, *Festuca ovina*, *F. vivipara*, *Luzula spicata*, *Poa alpigena*, *Potentilla crantzii* and *Saxifraga caespitosa* were all prominent; few Norwegian house-tops can have been more photographed.

Plant-collecting is not encouraged at Kongsvoll; to curb the activity of the over-enthusiastic, cautionary notices, illustrating the species requiring protection are posted at the hotel entrance. But the best advice to summer visitors is to recommend a visit to the small and carefully-kept botanic garden at Kongsvoll railway station. Here we spent our last morning in the Dovre and saw living examples of most of its special plants. Most botanists visiting Kongsvoll may lack the expert guidance which we enjoyed; if they make this garden the object of their first excursion, they will ascend the hill better prepared to recognise and respect the rarities of its plant life. The garden was founded long ago by the lady who gave Professor Nordhagen his first lessons in botany; now he and his wife are its honorary curators, and each spring they make the long journey from Oslo, to replace by their own efforts the losses caused by the rigours of the weather and the depredations of rodents during the winter.

It was with mutual regret that we took leave of Professor Nordhagen that morning; not only had we enjoyed and benefited from his company during the past few days, but indeed the whole course of our travels in Norway had been founded on his advice, and the way made easy by his cooperation. To many botanical pilgrims before us his name and Kongsvoll have become synonymous; now that official duties no longer claim him our best wish for him is continuing strength to return there many times and walk the famous slopes.

Our journey to the west was broken near Fokstua to visit a reputed locality for *Rubus arcticus*. The area did not look promising but presently Per Wendelbo found a non-flowering plant and eventually Mrs Russell, who had inspired this search, found a plant still in flower. Continuing westward, the car parties by-passed Otta by taking a back road from Laurgard to Voga. This little-frequented way led past a fine lake, nicely set in a cleft of the hills and beautifully calm on this sunny afternoon; here were such homely species as *Phragmites communis* and *Potamogeton perfoliatus* in the shallows, with *Aconitum septentrionale* on the roadside to remind us that we were still in Norway. At Lom Mr and Mrs Howitt had two hours botanising round the town and were rewarded with *Lappula myosotis*, *Hordeum jubatum*, *Androsace septentrionalis* and, abundantly on the football field, *Carex incurva*.

Beyond Lom the mountain scenery of the Jotunheim became more insistent and more impressive with every mile; far behind now lay the gentle grassy slopes of Kongsvoll and directly ahead were the rock and ice summits of the highest mountains in Northern Europe, the improbably named Galdhopiggen and Glittertind, each over 8,000 ft. We were accommodated for the next three nights in the tourist station at Bovertun, situated at one end of a small lake; here, at 3,100 ft, the evening air was chilly and we might have had uncomfortable nights but for the invaluable Per Wendelbo, who quickly demonstrated how to get the best out of the Norwegian wood stoves with which the bedrooms were equipped.

A walk along the lakeside road in the sunlight of the following morning revealed a landscape which, scenically, might be matched on many a Scottish loch shore. But *Gentiana nivalis* and *G. tenella* growing almost on the doorstep, and patches of *Aconitum septentrionale* in grassy roadside hollows where at home bracken would have flourished, weakened the illusion. It was finally shattered when, stepping off the highway, we discovered that the road had been cut through a *Dryas-Carex rupestris* heath, upon which we were actually setting sacrilegious feet. Here was a rich flora, combining many of the Kongsvoll plants with a generous sprinkling of the rarer British mountain species and a few novelties. We met here, for the first time *Minuartia* *biflora*, *Pyrola norvegica*, *Viola rupestris*, *Euphrasia lapponica* (the arctic equivalent of *E. salisburgensis*) and the little crucifer *Braya linearis*, here near the southern limit of its range. Higher on the slope were *Carex misandra*, *Chamorchis alpina* and *Draba cacuminum*. A steep little birchwood above the road, floored with assorted boulders from the slope above, added *Carex digitata*, *Polygonatum verticillatum*, *Paris quadrifolia*, *Sedum annuum*, *Woodsia alpina* and *Daphne mezereum;* after a search Arne Rosvik made perhaps the best of the day's discoveries, the leaves of *Cypripedium calceolus*. The lake shore produced *Carex microglochin*, *C. incurva*, *Stellaria calycantha*, *Saxifraga caespitosa* and *Juncus alpinus*, among many other worth-while plants.

Most of the next day was spent on the hillside immediately west of Bovertun, and this east-facing slope proved well worth the time spent on it. *Carex paupercula* and *C. limosa* grew in boggy ground just beside the road, and soon we were meeting new as well as old and now becoming familiar species. *Saxifraga tenuis*, with the appearance of a miniature *S. nivalis*, grew here; so did the variable hybrid sedge *Carex atrata* × *C. norvegica*, *C. rufina*, *C. adelostoma* (very close to *C. buxbaumii*), and the neat little *Deschampsia atropurpurea*. *Phyllodoce coerulea*, *Antennaria alpina*, *Cassiope hypnoides*, *Chamorchis alpina* and *Gnaphalium norvegicum* were all here and, at higher levels *Poa flexuosa* and *Luzula arcuata* appeared. In the late afternoon there was time for a brief visit to the southern shore of the lake, which supported a luxurious rush and sedge flora with a distinctly Scottish flavour:- *Juncus alpinus*, *J. biglumis*, *J. castaneus*, *J. triglumis*, *Carex atrata*, *C. norvegica*, *C. capillaris*, *C. atrofusca*, *C. saxatilis*, *C. lachenalii*. *Eriophorum scheuchzeri* was here too, and in the birch wood the *Ranunculus platanifolius—Milium effusum—Cicerbita alpina* association appeared again, with abundant *Cystopteris montana*.

That day at Bovertun was, in effect, the last combined operation of the meeting. The following morning we parted from Dr Wendelbo and Arne Rosvik, who planned to walk across country from Krossbu to the head of Sognefjord, while the rest of us were transported over Sognefjell. On the high ground here, at 4,700 ft, it can be understood that fine weather is not to be taken for granted, but our own car party was lucky; we stopped near the highest part of the road in conditions which were always dry and occasionally sunny. All around was a shattered landscape, compounded of water and rock, snow and ice. We spent some time absorbing the scenery of the Jotunheim, with its distant ice-fields from which the weak sun struck pastel pinks and blues, and the high corries of Fanaraki and the Skagastol peaks, with their little hanging glaciers. Listing the plants of the surrounding tundra produced the surprising total of 44 species. Soil conditions did not seem to be particularly favourable, and since the snow-line at this latitude is just over 5,000 ft, we must have been close to the flowering-plant limit; the list seems worth quoting:-

Agrostis borealis
Antennaria alpina
Anthoxanthum odoratum
Cardamine bellidifolia
Carex bigelowii
C. dioica
C. lachenalii
Cerastium alpinum
C. cerastoides
Deschampsia alpina
D. atropurpurea
D. flexuosa
Epilobium anagallidifolium
E. anqustifolium
Festuca ovina
Gnaphalium supinum
Hieracium alpinum
Juncus trifidus
Leontodon autumnalis
Luzula arcuata
L. spicata
L. sudetica
Lycopodium alpinum
Oxyria digyna
Phleum commutatum
Poa annua
P. flexuosa
P. pratensis
Polygonum viviparum
Polypodium vulgare
Polystichum lonchitis
Ranunculus glacialis

Rumex acetosa
Salix herbacea
S. lapponum
Saxifraga stellaris
Sedum rosea
Sibbaldia procumbens
Taraxacum sp.
Trisetum spicatum
Vaccinium uliginosum
V. vitis-idaea
Veronica alpina
Viscaria alpina

Once over the watershed the narrow, winding road led steadily downhill; the corries gave way to birch-clad slopes and presently, after a succession of hairpin bends, we stopped among the trees high above Fortun. Although we had travelled many miles in Norway, we were now for the first time entering real fjord country, and the rapid transition from the near-arctic conditions of the plateau to the relatively lush vegetation of the birch woods was striking. Here was *Matteuccia* again, with tall juniper (*Juniperus communis*) and pendulous *Betula pendula*; on the roadside rocks were *Silene rupestris*, *Saxifraga cotyledon*, *Asplenium septentrionale*, *Cardaminopsis petraea*, *Potentilla argentea*, *Linnaea borealis* and the most massive clumps of *Woodsia ilvensis* that we had seen so far. When finally we reached level ground again it was on a remote arm of Sognefjord, amid scenery dominated by waterfalls and apple orchards. At this distance from the open sea the salinity of the fjord water must have been low, but between Sogndal and Leikanger brown algae appeared on the shore.

The following morning brought a parting of the ways, for most of the party the next two days were to be spent en route for Bergen and the boat. I had arranged to have a few more days in Norway, so did not make this journey; I am indebted to Allan Stirling for news of it. Sognefjord was crossed to Vangsnes; roadside stops were made between Vik and Vinje and some interesting plants were seen. At one point *Chamaepericlymenum suecicum*, the true *Carex flava* and *Andromeda polifolia* were the reward; at another *Eriophorum scheuchzeri*, *Polystichum lonchitis* and *Epilobium lactiflorum* were the most noteworthy species. Beyond Norheimsund, on the following day, a marshy area recommended by Per Wendelbo was searched for *Carex chordorrhiza*; it was there, but in heavy rain not everyone saw it. For some of the less successful hunters there were compensations; *Scheuchzeria palustris* grew there, with *Andromeda*, *Carex limosa* and—for the first time in Norway—*Erica tetralix* and *Narthecium ossifragum*.

Several of my correspondents during the route-choosing period had mentioned Finse, so I had decided on a visit there before leaving Norway; it was to this end that we took a different route from Sogndal. Finse is almost due south of Sogndal, but the Hardanger plateau intervenes and there is no direct route across it. It was necessary to make a long detour to the east, the first step being to cross Sognefjord to Laerdal. Then followed a gradual ascent through a steep-sided gorge, during which the vegetational changes noted during the previous day's descent to Fortun were experienced in reverse; *Matteuccia* was prominent at first, then at higher levels *Aconitum septentrionale* followed by thinning birch and small grey willows; eventually another watershed was crossed in scenery reminiscent of the Moor of Rannoch, and we reached the main Oslo-Bergen road (and railway) at Gol. A sharp turn to the south-west along the Bergen road brought us, through the forested valley of Hallingdal, finally to Ustaoset; our accommodation in the fjellstue here proved more luxurious than any since we left Oslo.

At just over 4,000 ft Finse is at the highest part of the Oslo-Bergen railway; it is not approachable by road, so we had our first experience of Norwegian rail. There is no village at Finse; the few buildings, apart from railway offices, at the edge of the lake cater for the walking, climbing and ski-ing tourists. We made our way across the plateau to the snout of the Hardanger-jokulen glacier; a list of some 60 plant species was made on the way, and about one-third of them are uncommon or unknown in Britain:-

Agrostis borealis
Antennaria alpina
Arabis alpina
Bartsia alpina
Carex lachenalii
Cassiope hypnoides
Cerastium cerastoides
Deschampsia atropurpurea
Epilobium hornemanni
Eriophorum scheuchzeri
Gnaphalium norvegicum
Phleum commutatum
Ranunculus glacialis
Salix lanata
S. myrsinities
S. reticulata
Saxifraga cernua
S. caespitosa
Trisetum spicatum
Veronica alpina
Viscaria alpina

The *Gnaphalium* and the *Phleum* were particularly abundant; the other plants noted at Finse were those which form the basic vegetation of most Scottish mountains. On the plateau our good luck brought us again in touch with Per Wendelbo, who had come to Finse with his nine-year old son to join a party of Bergen students. His casual remark about the plant life, that 'most Norwegian mountains are like this', gave our list a special significance; a comparison with those made on Sognefjell and at Bovertun and Kongsvoll underlines the fact that, in Norway as elsewhere, to see the best plants one must go to the best places. In fact, Finse is richer botanically even than this suggests; in deciding to pay our respects to the glacier we had automatically rejected better botanizing, but there was not time for both. Indeed, to allow ourselves even that amount of time there we had to let the afternoon train leave without us and catch the next one, at 1.30 a.m., so it was about three o'clock in the morning when we tiptoed into the fjellstue at Ustaoset.

The remainder of that day, our last botanising in Norway, we spent at Ustaoset; the illusion of being in Scotland returned here, heightened on this occasion by just the kind of wet mist which so often enshrouds the botanist at the same altitude (3,280 ft). We did, however, discover that as well as providing a comfortable lodging, Ustaoset held good plants; during the day we encountered *Betula nana* in quantity, as well as the hybrid with the local segregate of *B. pubescens*; here also were *Agrostis borealis*, *Antennaria alpina*, *Athyrium alpestre*, *Juniperus nana*, a *Juncus* very close *to J. alpinus*, *Maianthemum bifolium*, *Gnaphalium norvegicum*, *Paris quadrifolia*, *Phleum commutatum* and *Stellaria calycantha*.

Making for Bergen the following morning, the road westward to Kinsarvik crossed a wild, rocky moorland, contouring the southern edge of the great Hardanger plateau, with occasional glimpses northward to its icefield. But for the low willow scrub the landscape was strongly reminiscent of Sutherland, still fresh in the memory from the 1962 field meeting. But a short divergence to see one of Norway's most famous waterfalls, the 600 ft drop at Fossli, followed by the seemingly endless descent of the fantastic looping road at Mabodalen, bringing us to fjord level at Eidfjord, put our geographical perspective right; thereafter there was an uneventful run into Bergen, where we spent our last two days in Norway. We did not travel far beyond the city boundary in that time, and saw little that is material to this report, but one observation seems worth making. In Oslo the commoner weeds noted had been such relatively unfamiliar plants as *Campanula rapunculoides*, *Lepidium ruderale*, two species of *Melilotus* and even, on occasion, *Thlaspi alpestre*; here, no more than eight hours by rail from Oslo—and that much nearer home—we had *Plantago major*, *Rumex obtusifolius*, *Senecio vulgaris* and *Stellaria media*.

The possibility of the future addition of further arctic species to the British list was in our minds during this Norway visit. At Kongsvoll we saw, in some quantity, *Diapensia lapponica*, *Artemisia norvegica* and *Koenigia islandica*; the first two so distinctive that some, seeing them for the first time, wondered why they had so long escaped detection at home. The answer is simple enough; in Scotland these plants occur in upland habitats well away from the botanical beaten track—places which are likely to be 'dull' botanically and on which, therefore, the average field botanist is unlikely to spend his time. In fact, when two of these three plants were found, plant-hunting was not the primary interest of the finders; the third was collected but misidentified, and lay for years unrecognised. How many similar discoveries remain to be made is a matter for speculation; Polunin, in a list of arctic species not yet found in Britain but having, in its author's opinion, the best chance of occurring there (*Watsonia*, **3**, 34) includes 50 species. No one, so far as I know, has attempted a corresponding list of potential habitats, but most of us are well enough aware that there is no lack of botanically unexplored corners north of the Highland Boundary Fault, and visits to such places must still offer the best chance of spectacular discovery; Ben y Gloe may yet reveal *Rubus arcticus* and *Pyrola chlorantha*. Apart from this, and having seen about two-thirds of Polunin's 50 species during the meeting, we experienced a growing realization that several of them resemble related British species closely enough to escape notice by the casual or less experienced searcher: in this category *Agrostis borealis*, *Equisetum scirpoides*, some species of *Poa*, *Salix polaris* and *Saxifraga tenuis* come readily to mind. Even unrelated plants such as *Kobresia myosuroides* and *Nardus stricta* can on occasion look superficially alike. This, too, is additional to segregates recognised by Norwegian botanists of such omnibus species as *Carex nigra* and *Luzula multiflora*, though I cannot say I envy them the 200 odd species of *Taraxacum* listed in the most recent flora. On the other hand, the same work does not include *Galium mollugo* subsp. *erectum* although we felt we should have so named some of the *G. mollugo*, which we saw. Nor are the forms of *Rhinanthus minor* segregated; perhaps one day a Norwegian journal will alert its readers to the possibility of finding unrecognised British species in their midst!

It will be clear to readers of this report that we had both pleasure and profit from our travels in Norway, and that this was in large measure due to the Norwegian botanists whose help we were fortunate enough to enlist. It was a novel and refreshing experience for most of us to be in the company of professional botanists who did not claim, even in mock self-depreciation, 'scarcely to know a buttercup from a daisy'; the case with these Norwegians was so far otherwise, and their knowledge of, and pride in, their native flora so great that they were happy to take time and trouble to demonstrate it to us. Indeed, throughout the country we met with a degree of national awareness which perhaps we ought to have anticipated; the years of the occupation are still fresh in the national memory. Since our visit Rolf Nordhagen has retired from his official post in Oslo, a change which brought additional responsibilities to Per Sunding, and Dr Wendelbo of Bergen has become Professor Wendelbo of Gothenburg. To them, our gratitude for the skill and patience they displayed in shepherding our band of pilgrims on this memorable journey cannot be too high, nor for their future well-being our good wishes too warm. I have my personal feelings of gratitude for those days; to our car drivers, who willingly co-operated in giving so many of us more freedom of movement than we could have had without them and, above all, to the other nineteen members of the party who, cheerfully and without complaint, endured a brand of leadership so nominal as to be almost non-existent. I can assure them that no one was more conscious of his shortcomings, or deplored them more, than the leader himself.—R. MACKECHNIE.

PERSONALIA AND NOTICES TO MEMBERS

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr Perring (address as above) include:

1. 35 mm filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards. Price 15/- per hundred.
3. Individual Record Cards. Price 10/- per thousand.
4. Vice-county maps (quarto size): Collin's 'New Naturalist' at 1s. 0d. each, and *Atlas of the British Flora* base maps at 3d. each.
5. Base maps of the British Isles with 100 km grid (quarto) at 2d. each.
6. Corrections to the *Atlas of the British Flora*: free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed would you please send us a copy?

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact D. E. Allen, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF *WATSONIA* AND *PROCEEDINGS*

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete 'runs'. The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part 5 and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

THREATS TO BRITISH FLORA

Members are urged to report to D. Streeter, 193 London Road, East Grinstead, Sussex, any threats to the British flora. The Council has appointed a Conservation

Committee to deal with such matters and every effort will be made 'to promote in every way possible the conservation of the British flora'.

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee (Dr D. Streeter, 193 London Road, East Grinstead, Sussex), who will send a form listing the detailed information required by the Nature Conservancy. The forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

CHALK GRASSLAND

An attempt is being made to collate all available information on chalk grassland ecology. In this connection it would be appreciated if any member engaged in or, having information on any aspect of research connected with chalk conservation, ecology or vegetation would please send details to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex). If this information has already been sent either to the Nature Conservancy's Research Section at Monks Wood or to the Secretariat of the County Naturalists' Trust Committee of the S.P.N.R. details are not required but only a note indicating the subject of the work.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Secretary of the Conservation Committee (D. Streeter, 193 London Road, East Grinstead, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seeds or other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

THE BRITISH MUSEUM MULL PROJECT

The Department of Botany of the British Museum (Natural History) has started a field programme in which it is intended that a floristic and descriptive ecological survey of the Island of Mull and its off-lying small islands (v.c. 103, Mid Ebudes in part) will be made during the course of the next five years. It is envisaged that the work will culminate in the production of a publication of the 'County Flora' type.

Since, unlike the authors of most county Floras, the department is equipped with staff, collection and library to deal, at least in theory, with all groups of plants, it is hoped that the final publication will be of unusually wide taxonomic coverage, covering most cryptogams, and will make a special feature of the ecological and geographical relationships of the flora.

It will be evident to those experienced in work of this kind, that the proposed programme is ambitious and represents a substantial commitment, in an entirely new field of activity, of the departments time and resources. For this reason we shall greatly welcome and appreciate offers of help from all interested persons. We have been very fortunate in gaining the active support and assistance of several Scottish botanists who are interested in the area, and we are already indebted to a number of specialists for the benefit of their expert opinions in certain critical groups.

During the past summer, the department had two parties in the field and even this limited experience has revealed new information of great interest, especially on the cryptogamic groups in the area, which have been very little explored. We shall be very pleased to give information relating to transport, accommodation and local botany, to anyone interested in visiting the island. While its weather cannot be recommended, the scenery and interest of the area does much to outweigh this disadvantage, and Mull and the associated area can be recommended confidently to those looking for a botanical holiday away from the well trodden paths to the famous shrines. We are well aware that, limited as we are by considerations of distance and time, our work can be greatly enriched by the help of others, which would of course receive appropriate recognition in the final publication.

If you can help or would like any further information, please write in the first instance to J. F. M. Cannon or E. B. Bangerter, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

VERONICA SECTION *BECCABUNGAE*

N. G. Marchant, Botany School, Downing Street, Cambridge, is investigating variation in the species of *Veronica* section *Beccabungae*, and would be grateful for herbarium specimens and if possible, seeds of these species.

ANNUAL SPECIES OF *SILENE*

Mrs E. Bari, Botany School, Downing Street, Cambridge, would be grateful for samples of wild-collected ripe seed of annual species of *Silene* from Britain or the Continent. Recently collected, unpoisoned herbarium material would be most welcome if a ripe sample could be extracted.

SCIRPUS

Dr J. K. Spearing of the Department of Botany and Zoology, Sir John Cass College, Jewry Street, London, E.C.3., is anxious to obtain viable seeds from reliably determined species of *Scirpus* (sensu lato), or alternatively fresh specimens with roots attached, for a comparative study of root anatomy of this genus. Notes on the provenance of specimens would be appreciated. Postage and packing costs will be refunded.

EDITORS OF *WATSONIA*

Dr C. D. K. Cook, Dr M. C. F. Proctor and Dr N. K. B. Robson have been appointed Editors of *Watsonia*.

All manuscripts to be considered for publication in *Watsonia* should be sent to Dr C. D. K. Cook, Hon. Receiving Editor *Watsonia*, The Hartley Botanical Laboratories, The University, Liverpool.

All books to be considered for review in *Watsonia* should be sent to Dr N. K. B. Robson, Hon. Review Editor *Watsonia*, c/o Department of Botany, British Museum (Natural History), London, S.W.7.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

INSTRUCTIONS TO CONTRIBUTORS

CONTENTS

Papers and short notes are invited on the taxonomy and distribution of British vascular plants as well as on topics of a more general character and wider appeal from both members and non-members of the Society.

Contributions should be sent to the Hon. Editor, E. F. Greenwood, c/o The City of Liverpool Museums, William Brown Street, Liverpool, 3.

The Society as a body takes no responsibility for the views expressed by the authors of papers.

COPY

TEXTS

Papers and short notes must be submitted in final fully corrected form. They should be typed in double-spacing, with wide margins and on one side of the paper only. Authors should keep a fully corrected carbon copy of their typescripts for reference.

TITLES AND SECTIONAL HEADINGS

The titles should be as concise as is compatible with lucidity and should be intelligible to the non-specialist. Authors are asked wherever possible to use sub-headings in the text as these give appropriate emphasis and improve the layout.

FOOTNOTES

Footnotes should be avoided whenever possible but may be used for brief notes which cannot be fitted conveniently into the text. They should be inserted in the typescript immediately below the line to which they refer.

ILLUSTRATIONS

Line drawings should be drawn boldly in Indian ink on good quality white paper and should be suitable for reproduction at about one half to two thirds (linear) their original size.

KEYS

Keys should be in one of the generally accepted forms, e.g., *Flora of the British Isles* by A. R. Clapham, T. G. Tutin and E. F. Warburg (ed. 2, Cambridge, 1962) and *Flora Europaea* (Vol. 1, Cambridge, 1964), provide suitable patterns.

NOMENCLATURE

Names of British vascular plants should normally follow the *List of British Vascular Plants* by J. E. Dandy (British Museum (NH) and B.S.B.I., London, 1958) and may then be cited without authorities. Otherwise authors names must be cited at least on the first occasion where they appear in the text.

REFERENCES

References to the literature should be arranged in alphabetical order of authors' names at the end of the paper. Each reference should be given in a standard form thus:-
Poore, M. E. D. (1956). The ecology of Woodwalton Fen. *J. Ecol.*, **44**, 455-492.

Abbreviations of titles of journals should be given in the form adopted by the *World List of Scientific Periodicals* (ed. 4, London, 1963-1965). The volume number should follow the abbreviated title of the journal and precede the page number. Citations in the text should be indicated by the authors name followed by the date of publication. If more than one paper is given in a single year they should be named thus:- Poore (1965a), etc.

Titles of books should be given in full and underlined together with the edition if other than the first, the volume number (Vol.) and the place of publication.

References to herbaria should include the abbreviations given in *British Herbaria* (B.S.B.I., 1958) and *Index Herbariorum* Part 1 (ed. 5, I.A.P.T., Utrecht, 1964).

If in doubt about the citation of names, references or the presentation of illustrations etc. contributors are advised to consult the editor before submitting their typescripts.

Much useful information and advice will be found in *General Notes on the Preparation of Scientific Papers* (ed. 2, Royal Society, London, 1965, price 5s. 0d.).

PROOFS

Authors will receive galley proofs of papers longer than 500 words. Particular care should be given to the thorough checking of references. There should be as few alterations as possible and where necessary any words or phrases deleted should be replaced by others of equal length.

OFFPRINTS

Authors of papers and contributors to Plant Notes, etc. are entitled to receive 25 offprints free of charge but may order at cost price additional copies when returning the corrected proofs.

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When the year of attaining membership appears in italics the records show that the member has resigned and rejoined during the period.

Institutions are normally listed geographically, but it should be noted that many institutions who do not appear in the list purchase the Society's publications through the Trade.

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September 1967 Volume Seven Part One

Contents

HUBBARD, J. C. E. & STEBBINGS, R. E. Distribution, Dates of Origin and Acreage of *Spartina townsendii* (*s.l.*) Marshes in Great Britain .. 1–7

PATON, AUGUSTA. True Service Trees of Worcestershire 9–13

TINKLIN, R. A Key to the Identification of the Male Flowers of British Dioecious Species 15–17

BRUMMITT, R. K. Three Species of *Sigesbeckia* in Britain 19–21

PERRING, FRANKLYN (Compiler). Supplement to A Guide for Local Flora Writers 23–24

PLANT NOTES 25–26

PLANT RECORDS. Compiled by E. C. WALLACE 27–32

ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 33–64

BOOK REVIEWS 65–66

OBITUARY 67–69

EXHIBITION MEETING, 1966 71–84

REPORTS

Report of the Council for 1966 85–88
Teesdale Defence Committee 89
Irish Region Report for 1966 89
Welsh Region Report for 1966 89–90
Committee for the Study of the Scottish Flora:
Twelfth Annual Report to 31st December 1966 90–91
Field Meeting 91–100

PERSONALIA AND NOTICES TO MEMBERS 101–104

INSTRUCTIONS TO CONTRIBUTORS 105–106

LIST OF MEMBERS AND SUBSCRIBERS 107–141

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A BROAD-LEAVED VARIETY OF *FESTUCA RUBRA* L.

A. J. WILLIS and SYLVIA M. KING*

Department of Botany, University of Bristol

INTRODUCTION

During ecological investigations at Braunton Burrows, N. Devon, attention was attracted by a large form of *Festuca rubra* L. which was outstandingly different in several respects from other varieties of *F. rubra* from the sand dunes and elsewhere. A number of colonies of this distinctive rhizomatous plant have been found at Braunton Burrows, mostly growing on low dune slopes which bear a fairly open vegetation and where there is some redistribution of sand. Vegetative material was collected from a single spreading colony in June 1965 and cultivated in a greenhouse; fruiting spikes were gathered from the same colony on the Burrows in September 1965.

The plant was initially determined as *F. rubra* subsp. *genuina* var. *planifolia* Hack., earlier noted by Howarth (1924) as occurring at Braunton (a specimen, det. W. O. Howarth, dated 1840 from Braunton in the Charles Bailey Herbarium, Manchester (MANCH), matches the present plant) and also on the sand hills between Marske and Saltburn, N. E. Yorks. This form, given specific rank by Richter (1890), and recorded only in a very few other localities in Britain (Moray, Elgin), seemed to merit further study. Accordingly its structure was compared with that of *F. rubra* from a range of habitats, and its germination behaviour was also investigated. Dr C. E. Hubbard has considered the nomenclature of this taxon, and his studies indicate that it may best be referred to, for the time being, as *F. rubra* L. var. *multiflora* Wallr.; this varietal name is used below.

FLORAL CHARACTERS

The spikelets are large (on average about 14 mm long), many-flowered (normally 5-11) and almost glabrous (some minute hairs are present). Normal pollen is produced, and grain set is fairly good. In floral morphology *F. rubra* var. *multiflora* differs from other varieties in two main respects: size of the parts and length of the awns. For purposes of comparison, twenty-five measurements were made of the length of the glumes, lemmas and awns of spikelets of the broad-leaved form and of spikelets of fifteen other populations of *F. rubra* from dunes, marshes and other habitats in England, Wales and Ireland. Awns were measured to the nearest 0·1 mm, and glumes and lemmas to the nearest 0·25 mm,

---

*Now at the Herbarium, Royal Botanic Gardens, Kew.

A

all measurements being made on dried specimens. The mean values obtained were as follows:

	var. *multiflora*	Range of means of 15 other populations
Lower glume	4·2 mm	2·7 - 3·9 mm
Upper glume	5·3	4·0 - 5·6
Lemma	7·2	4·6 - 6·3
Awn	0·5	0·5 - 1·8

Histograms showing the contrast in size of floral parts between var. *multiflora* and a common sand-dune race of *F. rubra* from Morfa Harlech, Merioneth, are given in Fig. 1. These histograms, despite minor irregularities attributable to

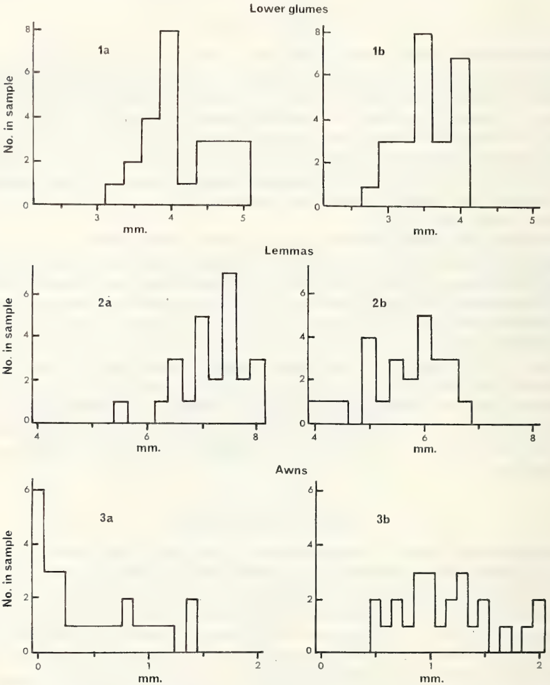

FIGURE 1. Variation in lengths of floral parts of *F. rubra*. The histograms, based on 25 measurements, show: length of lower glumes, 1; lemmas, 2; and awns, 3. var. *multiflora*, a; var. *rubra*, b.

the small sample size, indicate the larger lower glumes and lemmas and shorter awns of var. *multiflora*. Statistical tests showed that var. *multiflora* was significantly different from seven of the other populations in respect of all the four measurements made, and that it stands apart from all the other populations studied in at least some of the measurements. Subsequent studies of var. *multiflora*, based on larger counts made on specimens collected in 1967, gave average measurements as follows: spikelet length 13·6 mm, lower glume length 4·9 mm, upper glume 6·0 mm, lemma 7·0 mm and awn 0·8 mm.

The large lemmas of var. *multiflora* coupled with the short awns give the spikelets a distinctive appearance, different from that of normal *rubra*. Indeed in some spikelets the awns are completely absent, a condition contrasting with that of all the other plants studied. The upper glumes of var. *multiflora* have short lateral veins as shown in Fig. 2 where the main differences in floral structure between this and var. *rubra* are illustrated. The large lower glume of *multiflora* may be noted. Also the dark-brown grain of *multiflora* is rather plump and ovoid when mature (Fig. 2), not oblong as in many populations of *rubra*.

VEGETATIVE CHARACTERS

The flat leaves of var. *multiflora* are one of its most distinctive features; many are about 3 mm wide. The sheath is rounded and entire, and the ligule is a small colourless flap of tissue. There is some superficial resemblance of *multiflora* to *F. pratensis* Huds., but *F. pratensis* contrasts, for example, in its split leaf sheaths, prominent auricles, and in its non-rhizomatous habit. Branches develop intravaginally and the tip of the leaf is rather blunt and hooded, not acutely tipped as in *F. juncifolia* St.-Amans.

In *F. rubra* var. *multiflora* and var. *arenaria* the leaf is bright green and ridged above; below it is smooth and grey-green, with a thicker cuticle. The blade is prominently ridged in *multiflora*, bearing numerous hairs. In the smaller rolled lamina of *arenaria* the ridges are less pronounced and the hairs sparser and shorter.

Leaf anatomy has been regarded as valuable in the classification of the many forms of *Festuca rubra* L., although Kjellqvist (1961) has shown that differences in leaf anatomy may arise as a result of environmental influences. Hackel (1882), Howarth (1919, 1924) and others have used the arrangement of the sclerenchyma in the leaf in relation to the vascular bundles as an important taxonomic criterion. Varieties *multiflora* and *arenaria* were found to differ considerably in this character. As seen in Fig. 2, there are ten vascular bundles in var. *multiflora* and only seven in var. *arenaria*. Large bundles alternate with smaller ones in both instances. In var. *multiflora* each vascular bundle has a sub-epidermal sclerenchymatous strand below it, and also a group of thinner-walled sclerenchymatous cells at the tips of the ridges above each bundle (not shown by Howarth, 1924, Pl. 26). In var. *arenaria* the leaf is more heavily lignified. There is a much larger sclerenchymatous strand beneath the central vascular bundle, and the sclerenchyma beneath the two most peripheral vascular bundles on each side of the blade forms a continuous sub-epidermal band extending slightly on to the upper surface. In var. *multiflora* there is also a sclerenchymatous bundle along the margin of the lamina, but it is not connected with the other sclerenchymatous strands (King, 1966). The tips of the ridges in var. *arenaria* are completely unlignified.

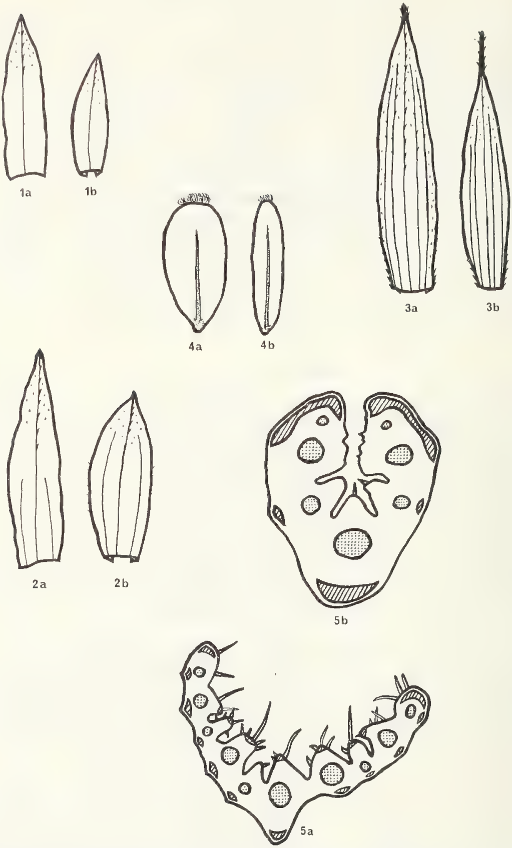

FIGURE 2. Floral features and leaf anatomy of varieties of *F. rubra*. Lower glumes, 1; upper glumes, 2; lemmas, 3; grains, 4; T. S. of leaf, 5. Var. *multiflora*, a; var. *rubra*, b, except that 5b refers to var. *arenaria*. 1-4, × 6·4; 5a, × 30; 5b, × 68.

Turgor cells occur between the ridges on the upper surface of the leaf in both varieties. These cells are very much larger in var. *multiflora* than var. *arenaria*. Their presence in the former is of interest in relation to Hackel's view that the flat-leaved forms of *Festuca* are more primitive than those with folded leaves. The existence of turgor cells in *multiflora* suggests that it is advanced, and the occurrence of flat leaves a secondary character. However, when the plant becomes desiccated the leaves actually do inroll as in other forms of *F. rubra*; under severe water stress the turgor cells become flaccid and collapse, closing the leaf. The numerous long hairs on the upper epidermis and the sclerenchyma caps at the tips of the ridges may help prevent excessive water loss, the leaf remaining flat under most conditions.

GERMINATION

Germination experiments revealed further marked differences in var. *multiflora* from other varieties of *F. rubra* investigated. The percentage germination of grains of var. *multiflora* was lower than for most of the other populations of *F. rubra*. Seedlings of all varieties studied were very similar in external appearance except those of var. *multiflora* which grew far more quickly and were altogether much sturdier than the others. The leaves of the seedling are wide and flat, not narrow and inrolled as in all the other types. The coleoptiles are longer, and a striking deep red colour in contrast to the smaller, very pale pink coleoptiles of the other seedlings. Daily measurements of the coleoptile, radicle, and first leaf of the seedlings showed that the larger size of the coleoptiles of *multiflora* results from a faster growth rate rather than a longer growing period, and the same is also true of the radicle and first leaf.

CHROMOSOME NUMBER

For the study of the chromosome status of var. *multiflora*, preparations were made from the tips of roots of several plants transferred from the dunes at Braunton and grown in a greenhouse. The root tips were placed in a saturated solution of *p*-dichlorobenzene for 1½ hr. at room temperature to promote the accumulation of metaphase configurations. The preparations were then stained and squashed in propionic-orcein.

The counts on several metaphase figures showed the diploid number of chromosomes to be 42, as indicated in Fig. 3, a frequently observed number for British plants of the *F. rubra* group.

TAXONOMIC POSITION AND NOMENCLATURE

There appear to be several broad-leaved Fescues in the *F. rubra* group (*s.l.*), some on coastal sands in Britain and others inland. One race, with leaves permanently flat, is referred to by Howarth (1948) as *F. juncifolia* St.-Amans forma *planifolia* Hack. However, the plant described above, although resembling *F. juncifolia* in general appearance and in its large lemmas, is distinct in its rather blunt, hooded leaf tips, in the anatomy of the leaf blades (in *F. juncifolia* the sclerenchyma forms a continuous band beneath the epidermis) and in its almost glabrous spikelets.

In the intraspecific classification of *F. rubra* put forward by Hackel (1882), flat-bladed Fescues were referred to *planifolia* in the scheme as follows:

F. rubra subsp. (1) *heterophylla*
(2) *eu-rubra*

variety (a) *fallax*
(b) *planifolia*
(c) *genuina*, including subvar. *arenaria*.

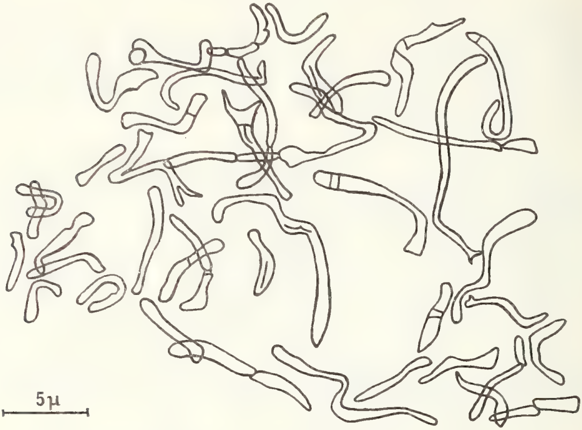

FIGURE 3. The chromosomes of *F. rubra* var. *multiflora*. The drawing was made from a preparation of a root tip by P. L. Thomas. $2n = 42$.

Hackel took up the epithet *planifolia* from *F. rubra* L. var. *planifolia* Trautv. (Trautvetter, 1877) for several flat-leaved forms, and cited Trautvetter's name as a synonym of his subvar. *villiflora* Hack. Trautvetter, however, described a Siberian grass with flat blades and 'spiculis villoso-pubescentibus', almost certainly distinct from the *rubra*-group plants to which the epithet *planifolia* has been applied in Britain.

In Howarth's (1924) revision of the classification of Fescues, based on a study of British forms, *heterophylla* was given specific rank, and *planifolia* placed as a variety of the subspecies *genuina*, which with subsp. *fallax* constituted *F. rubra*. Howarth commented that *planifolia* differed materially from forms of *genuina* only in its flat radical leaves, and later (Howarth, 1948) included *planifolia* Hack. as a possible (but queried) variety of subsp. *duriuscula* of *F. rubra*.

The evidence reported in this paper, however, suggests that the present plant contrasts with most races of *F. rubra* not only in its flat leaves and leaf anatomy, but also in its large spikelets, large glumes and lemmas, short awns and ovoid grains, and in seedling morphology and growth rate. In view of these characters, this very pronounced form may merit higher taxonomic rank than variety, perhaps being specifically distinct. However, old European floras refer to similar flat-bladed glabrous-spikeleted plants as varieties of *F. rubra*, and antedate var. *planifolia* Trautv. Two such varieties omitted in Hackel's monograph (1882) are *F. rubra* L. var. *multiflora* Wallr. (Wallroth, 1822) and *F. rubra* L. var. *major* Spenner (Spenner, 1825). In their account of the European species of *Festuca*, Ascherson and Graebner (1900) give the name *F. rubra* var. *multiflora* to the flat broad-bladed form of *F. rubra* with large spikelets and short-awned lemmas, based on *F. multiflora* Hoffm. (Hoffmann 1800 a, b.) This name is cited by Hackel (1882) as a synonym of *F. rubra* var. *planifolia*. Ascherson and Graebner include *F. rubra* var. *planifolia* Hack. (non Trautv.) and *F. planifolia* Richter (Richter, 1890) as synonyms of *F. rubra* var. *multiflora*. *F. rubra* var. *multiflora* Wallr. includes *F. multiflora* Koeler (Koeler, 1802) as a synonym, while Koeler cites *F. multiflora* Hoffm., so that *F. rubra* var. *multiflora* Wallr. is indirectly based on Hoffmann's Fescue. The description of *F. multiflora* given by Hoffmann (1800 a, b) resembles that of the present plant; the diagnosis includes 'fol. hirsutis latiusculis, spiculis paniculatis 5-10-floris aristatis glabris.' It may be noted that Hoffmann and later authorities cite *Festuca pratensis* Schreber (Schreber, 1771) as a synonym of *F. multiflora*.

It is concluded that the Fescue from Braunton Burrows should be provisionally named *F. rubra* var. *multiflora* Wallr., and it is hoped that further study may elucidate more fully the status of this and other flat-leaved Fescues in Britain. Recent investigations indicate, for example, the existence of somewhat similar but less fertile forms at Braunton Burrows with more hairy spikelets and longer awns; it is possible that these may prove to be variants within a continuum.

ACKNOWLEDGEMENTS

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A GLABROUS PERENNIAL *SONCHUS* IN BRITAIN

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ABSTRACT

Recent work in North America and Norway treats certain glabrous plants allied to *Sonchus arvensis* L. as a species, *S. uliginosus* Bieb., differing in chromosome number and in morphological characters. This work is reviewed and an attempt made to apply the characters to British material. The conclusion is reached that differences in morphology alone are insufficient to justify separating the two taxa in the grade of species, but indicates that further investigation is desirable. The purpose of this paper is to draw attention to the need for cytological and other studies of these plants in Britain.

INTRODUCTION

A well known and prominent character of *Sonchus arvensis* L. is the presence of abundant yellowish gland-tipped hairs on the peduncles and involucres. The occurrence of closely allied plants on which these hairs are absent has been known in Europe for at least 160 years, and in England since 1873. These glabrous* plants have attracted considerable attention but have generally been regarded as minor variants of little importance. Recent work suggests that there may be two taxa at species level differing in several morphological characters, in habitat and in chromosome number. It is the purpose of this paper to draw attention to the records of glabrous perennial sow-thistles in Britain with a view to the encouragement of further work.

These plants have been more thoroughly investigated in North America than elsewhere. They were introduced from Europe or western Asia and *S. arvensis* L., with characteristic glands, was first recorded in 1814 by Pursh. The first evidence of glabrous collections is 1894 and these were identified first as *S. arvensis* var. *glabrescens* Guenth., Grab. & Wimm., and later as *S. uliginosus* Bieb. (Small, 1921). Both taxa spread and by 1942 when Groh discussed their distribution in Canada the glabrous plant was still 'only sparingly in the east'. In the 8th edition of Gray's *Manual*, Fernald distinguished *S. arvensis* and *S. uliginosus* by the shape of the involucres and colour of the phyllaries and recognised a 'glabrous or nearly so' variety of *S. arvensis*. (Fernald, 1950). By this time both taxa had spread widely and were attracting research as noxious agricultural weeds.

In 1955 Shumovich and Montgomery produced their important paper on 'The perennial sowthistles in northeastern North America' and showed that *S. arvensis* is a hexaploid with a somatic number of 54 (instead of 64 as previously supposed), while *S. uliginosus* is a tetraploid with a somatic chromosome number of 36. They found that the species could be crossed reciprocally and that F_1 plants were easily obtained experimentally, and they all had the expected somatic number of 45. In fields where glandular and glabrous plants occurred together, there were plants with only a few glands which they suspected of being hybrids. These proved to have $2n = 37, 38, 39, 40, 41, 42$, or 43, and were regarded as the product of backcrossing with the parents, or intercrossing of hybrids. They reviewed the literature and concluded that '*S. uliginosus* Bieberstein was the first validly published epithet to be applied to the species', that they had only one species of smooth perennial sowthistle within the area they studied (Ontario), and that North American material agreed with European so named. While they established a clear cytological distinction between genetically pure glandular and genetically pure eglandular plants, they failed to substantiate other morphological characters (Shumovich & Montgomery, 1955.). Boulos, as part of his general review of the genus *Sonchus*, considered the work of Shumovich and Montgomery and decided to group all the glabrous as well as the hairy forms under one and the same collective species, *S. arvensis* L., composed of several races of different chromosome numbers, all with the basic number $x = 9$, (Boulos, 1961). This was solely on the basis of convenience and no additional evidence was produced.

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*The term glabrous which has been used by all previous writers is not strictly correct. The buds carry a woolly tomentum which is deciduous and as it is shed white tufts form, especially at the base of the phyllaries and on the upper peduncles. By the time the flowers open this is usually, though not always, lost. The term glabrous is used here for convenience.

Dahl in applying the American work to Norwegian plants treated *S. uliginosus* Bieb. as a distinct species differing from *S. arvensis* not only by its glabrous pedicels and involucres, and chromosome number, but also in the shape and size of the involucre, and in their subumbellate arrangement. He found that *S. uliginosus* probably arrived in Norway around the middle of the 19th century and remained, rare up to 1900, but is now common around Oslo and in scattered localities elsewhere. He did not count the chromosome numbers of Norwegian material. (Dahl, 1966).

The evidence is therefore somewhat conflicting. Fernald and Dahl confidently claim that *S. arvensis* and *S. uliginosus* can be distinguished morphologically by characters other than the presence or absence of glandular hairs while Shumovich and Montgomery were only able to find that they differed in being glabrous or otherwise and in chromosome number. In North America and Norway there is a well documented history of the spread of *S. uliginosus*. The next step is to review the characters which have been suggested for differentiating the two species.

REVIEW OF DIFFERENTIATING CHARACTERS

1. PUBESCENCE. In typical *S. arvensis* the pedicels and involucres are clothed with abundant gland-tipped hairs which are absent in *S. uliginosus*, which is therefore described as glabrous. The work of Shumovich and Montgomery has shown that in mixed populations intermediates may be explained away as hybrids.

2. INFLORESCENCE. In *S. uliginosus* the inflorescences are subumbellate 'while in *S. arvensis* the inflorescences are more dichotomically branched although subumbellate inflorescences occasionally occur' (Dahl, 1966). From examination of a long series of herbarium material from Europe and North America this seems to be a fair generalisation. In *S. uliginosus* the subumbellate character is often very well marked, but it has little diagnostic value.

3. INVOLUCRE SHAPE. This is described by Fernald (1950) as 'broadly campanulate or hemispherical' in *S. arvensis*, and 'slenderly turbinate to cylindric in *S. uliginosus*'. Shumovich and Montgomery found that the bud-shape differed, and Dahl demonstrated with a figure differences in the shape of the heads at defloration. It seems that the heads are in general more slender in *S. uliginosus*.

4. INVOLUCRE SIZE. Fernald (1950) claimed that the involucres in *S. arvensis* are 1·5–2·5 cm high, and in *S. uliginosus* 1·2–2 cm. Dahl measured 17 collections of *S. arvensis* from near Oslo and gives the mean as 15·12 mm, standard deviation 0·91 mm, and range 14–17 mm. He measured 20 collections of *S. uliginosus* from near Oslo and arrived at mean 12·20 mm, standard deviation 1·40 mm and range 10–15 mm. The difference is therefore small but significant.

5. PHYLLARIES. Fernald (1950) describes these as 'deep green to lead-coloured . . . uniformly coloured' in *S. arvensis*, and 'pale . . . mostly with white margins' in *S. uliginosus*. There is a sharp contrast between extreme *S. arvensis* with very dark green, almost black, phyllaries, and extreme *S. uliginosus* with pale olive phyllaries with broad white margins, but every intermediate is to be found.

6. HABITAT. The two taxa can occur together in the same fields and recent writers do not stress habitat differences. It seems significant however that about half the sheets of *S. uliginosus* from Canada in Herb. Kew (K) are from lakesides, while from the rest of the material one is from a refuse tip, and another labelled as a recent introduction along a railway.

7. CYTOLOGY. Boulos sets out the published chromosome counts as follows (Boulos, 1961):

Author	*Species*	*2n.*
Wulff, 1937	*S. arvensis*	64
Erlandsson, 1950	*S. arvensis*	64
Sakisaka, 1950	*S. arvensis*	64
Shumovich and Montgomery, 1955	*S. arvensis*	54
	S. uliginosus	36
	S. arvensis × *uliginosus*	45
	Intercrosses of *S. arvensis* × *S. uliginosus* and backcrosses with *S. arvensis* and *S. uliginosus*	36, 37, 38, 39, 40, 41, 42, 43, 47, 48, 50, 52, and 54.

THE OCCURRENCE OF GLABROUS PLANTS IN BRITAIN

The earliest recognition in Britain of a glabrous taxon allied to *S. arvensis* is the entry of '*S. arvensis* b. *glabra*' in the *London Catalogue*, 7th ed., 1874. This was probably based on J. L. Warren's discovery in 1873 of glabrous plants on the Thames-side between Putney and Hammersmith and such plants were then regarded as rare (Warren, 1876). Only eight years earlier, Syme had drawn attention to the occurrence of plants with glabrous peduncles in Europe and said they had not 'been noticed in Britain' (Syme, 1866).

Further gatherings of glabrous plants were made from the Isle of Wight, 1883; Shotover, Oxon, 1884; Shirley, Derbyshire, 1888; Tongue, Sutherland, 1900; Lincolnshire, 1903; Walton, S. Lancs., 1913; Gwynnant, Caernarvonsh., 1917; Petworth, W. Sussex, 1918; E. Mersea, Essex, 1919. These widely scattered early records suggest closer observation by botanists rather than the spread of an alien introduced from Europe. On the other hand, glabrous plants were collected at Avonmouth Docks in 1924, 1927, and 1950 and could reflect introductions with the numerous aliens for which these docks are famous. They have also been found on refuse tips such as the Elgin Corporation Tip, Moray, in 1958.

My own interest in these plants dates from 1941 when I found a colony in a depression on clay on Epsom Common, Surrey which attracted attention from a little distance 'as differing from the normal form of *S. arvensis* in their larger flowers, more slender habit and shiny leaves. Closer investigation showed that the peduncles and involucres were completely 'glabrous'. It was identified with *S. arvensis* L. var. *laevipes* Koch and distinguished from the forms of cultivated land with a few glandular hairs to which the name had sometimes been applied in this country. (Lousley, 1944.) Shortly after this, J. P. M. Brenan found 'glabrous' plants among sedges on Oxford Clay near a pond on Wytham Hill and suggested the name *S. arvensis* var. *glabrescens* Guenth., Grab. & Wimm. (Brenan, 1946 a & b). A review of British material suggests that glabrous plants have been found most often in wet places such as marshes and pondsides but are not restricted to such habitats. There are also maritime variants of *S. arvensis* which are sometimes glabrous.

APPLICATION OF ALLEGED DIFFERENTIATING CHARACTERS TO BRITISH MATERIAL

Material in the herbaria at the Royal Botanic Gardens, Kew (K), the British Museum (Natural History) (BM), the Druce Herbarium, Oxford University (OXF), and various smaller collections has been examined to test the application to British specimens of the differentiating characters mentioned earlier.

1. PUBESCENCE. Intermediates between glabrous plants and those with abundant glandular hairs occur and probably form a continuous series. Very careful examination often reveals very occasional glandular hairs on specimens which have been accepted as completely glabrous. In view of the work of Shumovich and Montgomery only plants without glands have been considered for the following characters.

2. INFLORESCENCE. In glabrous plants the subumbellate character is well marked, but it is likewise common in glandular *S. arvensis.*

3. INVOLUCRE SHAPE. I am unable to find any difference between the shape of the inflorescence in glabrous and glandular plants.

4. INVOLUCRE SIZE. Measurement of the height of involucres in full flower of British material in Herb. Kew (K) revealed significant differences though these were not easy to detect by eye.

(a) Glabrous. 72 involucres were measured on 11 herbarium sheets. The height ranged from 11 to 18 mm, with an average of 14·5 mm.

(b) Glandular. 38 involucres were measured on 7 herbarium sheets. The height ranged from 14 mm to 20 mm, with an average of 19·4 mm.

These differences were so interesting that North American material in Herb. Kew (K) was measured for comparison:

(a) Glabrous. 19 involucres were measured on 5 sheets. The height ranged from 10 mm to 17 mm, with an average of 12 mm.
(b) Glandular. 9 involucres measured on 3 sheets. The height ranged from 15 mm to 20 mm, with an average of 17 mm.

These results need to be tested against a very much larger sample taken from growing plants under similar conditions, but they suggest that differences of the order of those indicated by Fernald and by Dahl also apply in Britain.

5. Phyllary colour. Glabrous plants usually have paler phyllaries with more conspicuous white margins but they cannot be separated by these characters.

6. Habitat. No clear differentiation but glabrous plants tend to favour moist habitats.

TABLE 1. INVOLUCRE HEIGHT IN BRITISH MATERIAL

Height in millimetres — specimens in Herb. Kew (K)

A. INVOLUCRES AND PEDUNCLES GLABROUS

1. Townsend. Avonmouth	12
2. Sandwith. Avonmouth, 1927	15, 12, 15, 14, 15, 15, 12, 15
3. Sandwith. Avonmouth, 1924	15, 11, 12
4. Sandwith. Avonmouth	12, 14, 11
5. Brenan, 7075. Wytham	16, 16, 18, 16
6. Hubbard, 12555. Wytham	14, 16, 14, 14, 15, 15, 15
7. Lousley. Epsom, 1941	15, 15, 13, 15, 12, 15
8. Comber. Worplesdon	15, 15, 16, 16, 15, 15, 14, 15, 15, 15
9. Wheldon. Walton	16, 16, 16, 14, 17, 15, 17
10. Webster, 2178. Elgin	12, 12, 15, 12, 13, 13, 12, 15, 15, 14, 13
11. Taylor, 0372. Sundon	16, 16, 15, 18, 15, 16, 16, 15

Height	11.	12.	13.	14.	15.	16.	17.	18.	mm
Number	2.	10.	6.	10.	27.	13.	2.	2.	

Average of 72 involucres = 14·5 mm

B. INVOLUCRES AND PEDUNCLES GLANDULAR

1. Webster, 3845. Elgin	16, 20, 16, 16, 14, 17, 15, 16, 18, 16, 18, 18
2. Taylor, 0371. Sewell	15, 15, 16
3. Hubbard, 12146. Kidlington	16, 15, 16, 16, 16, 16
4. Ross-Craig & Sealy. Epsom	17, 16, 17
5. Lester-Garland. Oxford	17, 19, 16
6. Hubbard. Isleworth, 1933	16, 17, 18
7. Hubbard, 12330. Kirtlington	18, 17, 20, 17, 19, 20, 17, 17

Height	14.	15.	16.	17.	18.	19.	20
Number	1.	4.	14.	9.	5.	2.	3

Average of 38 involucres = 19·4 mm

TABLE 2. INVOLUCRE HEIGHT IN NORTH AMERICAN MATERIAL

Height in millimetres — specimens in Herb. Kew (K)

A. INVOLUCRES AND PEDUNCLES GLABROUS

1. Irvine, 657. Montana	10, 10, 12·5, 10, 11, 11
2. Irvine, 657. Montana	10, 11, + bud + fruit
3. Scoggan, 4215. Manitoba	15 + many buds
4. Baldwin, 5952. Quebec	16, 14, + buds
5. Lowe, 1908. Winnipeg Beach	11, 15, 11, 15, 16, 17, 14, 10, + buds

Height	10.	11.	12.	13.	14.	15.	16.	17
Number	5.	5.	1.	0.	2.	3.	2.	1

Average of 19 involucres = 12 mm

B. INVOLUCRES AND PEDUNCLES GLANDULAR

1. Cormach. Newfoundland	15, 16, 17
2. Fernald & Wiegand, 6418. Newfoundland	20, 15, 18, + buds
3. Robinson, 1894. Newfoundland	17, 16, 16

Height	15,	16,	17,	18,	20
Number	2,	3,	2,	1,	1

Average of 9 involucres = 17 mm

NOMENCLATURE

The glabrous plant allied to *S. arvensis* is correctly identified with *S. uliginosus* Marschall v. Bieberstein, 1808: *Flora Taurico-Caucasica*, vol. **2**, p. 238. Material from the Caucasus collected by Hohenacker in 1842 (Hb. Kew (K)) agrees closely with British specimens. The appropriate names in various grades appear to be as follows:

S. arvensis L. subsp. *uliginosus* (Bieb.) Neumayer, 1930: *Verh. Zool.-Bot. Gesellsch. Wien*, **79**, 397.

S. arvensis var. *glabrescens* Guenth., Grab. & Wimm, 1824: *Enum. Stirp. Phanerog. Silesia*, p. 127.

S. arvensis forma *uliginosus* (Bieb.) Javorka, 1925: *Magyar Flora*, p. 1195.

Of the other names which have been applied it should be noted that *S. arvensis* var. *laevipes* Koch (*Syn. Fl. Germ. & Helv.*, 2nd ed., **2**, 498, 1844) covers plants with the involucres subhispid as well as those with both peduncles and involucres glabrous.

CONCLUSION

From this preliminary investigation it is evident that the morphological characters alone would not justify treating the glabrous plants in Britain as a separate species, but further work is desirable. The immediate need is for cytological investigation to ascertain if the Canadian results apply in this country. If these are confirmed *S. arvensis* and *S. uliginosus* would form a very suitable subject for network research by members of the Botanical Society of the British Isles.

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A NOTE ON WISTMANS WOOD, DARTMOOR

P. J. M. GREENSLADE

INTRODUCTION

Wistmans Wood is one of three high level oakwoods on Dartmoor, the others being Piles Copse and Black Tor Beare. It is situated near the centre of the moor and consists of more than eight acres (3He) of pedunculate oakwood at about 12-1400 ft (364-424·6 m). Descriptions of it are given by Tansley (1949), Harvey (1953) and Archibald (unpublished). The wood is of interest for its rich bryophyte flora, the contorted growth forms of many of the older trees, and also for the very existence of a pedunculate oakwood in a moorland situation where the sessile species, if any, might be expected. Since the wood is now a Forest Nature Reserve and is mentioned in recent publications by Simmons (1962, 1965) and Archibald (1966) it seems worthwhile to report the following observations made in the course of entomological work between 1955 and 1958. The main purpose is to stress drainage in relation to the occurrence of the oaks. This has not been considered by previous authors although Wistmans Wood seems to provide a good example of the importance of this factor in upland ecology.

VEGETATION OF THE AREA

A map of the immediate Wistmans Wood area is given by Archibald (1966) and the west-facing hillside on which the wood lies can be divided into three zones (Fig. 1a):

I, rather flat by the West Dart river,
II, rising abruptly and including the wood,
III, an even slope to the hillcrest.

Zone I is dominated by heavily grazed grasses with *Juncus* tussocks. There are some bogs and flushes with *Sphagnum* and *Polytrichum commune*, and in the drier parts bracken, *Pteridium aquilinum* and gorse (both *Ulex gallii* and *U. europaeus*) occur with *Calluna vulgaris* and *Erica cinerea*.

Zone II contains the wood, mainly oak, *Quercus robur*, surrounded by an irregular belt of bracken (see Archibald's map) in which *Galium saxatile* and *Potentilla erecta* are present. To the south of the wood this zone is dominated by gorse.

In Zone III there is open *Nardus stricta* grassmoor with gorse and less commonly *Vaccinium myrtillus*, usually associated with clitter, the granite blocks lying on the surface of the moor. Towards the ridge top there are bogs and pools and *Juncus*, *Erica cinerea*, *E. tetralix* and *Calluna* become more frequent.

These zones can be contrasted in terms of three factors.

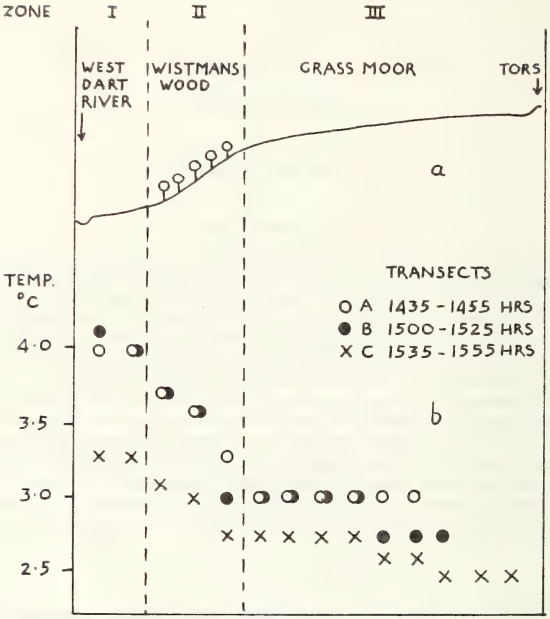

FIGURE 1 (a) Diagrammatic section of Wistmans Wood hillside showing zones, I-III.
(b) Temperatures recorded in three transects, A-C, in Jan. 1958.

EXPOSURE

Temperatures were recorded on 31st January 1958, a dull day with a light easterly wind, on three transects up the hill: A from the river to Littaford tor, C from the river to Longford tor and B parallel with and between A and C. On each transect records of air temperature were made at a series of points both ascending and descending the hill. Mean values for each station are given in Fig. 1b. This shows a marked fall in temperature on emerging from the shelter of zone II and another on the hill crest open to the wind. The wood itself is rather sheltered from all but S.S.W. winds.

DISTRIBUTION AND ORIGIN OF CLITTER

In zone I there are a few scattered stones, in zone II deep, jumbled clitter and in zone III the clitter varies from light to dense. It is suggested that it comes from two sources. In zone III the usual explanation applies in that the clitter is likely to have been derived and transported from the hill-crest tors under periglacial conditions. In zone II however it is more probable that it was formed *in* *situ.* In places the section of the zone is concave, Fig. 2a rather than b, while on the south slopes of Crow tor to the north of the wood there is a patch of clitter on the upper edge of such a concavity forming a miniature scarp a few feet in height (Fig. 2c). Opposite the wood, below the most northerly of the Beardown tors are two horse-shoe shaped depressions with some clitter within them but most near the upper edges where the gradient is steepest; similarly the north part of Wistmans Wood lies on a steeply inclined crescent of clitter. None of these situations lends itself to explanation in terms of transported clitter. Instead they strongly suggest subsidence or downward displacement of the upper layers formed by the false bedding-planes which the Dartmoor granite shows so clearly in the tors. If formed in these circumstances the clitter in zone II represents disturbance to the granite extending well below the present ground surface.

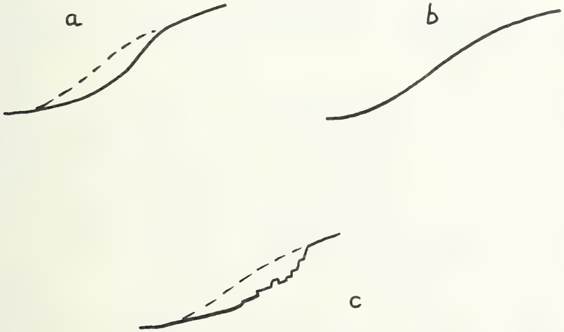

FIGURE 2. Sketches of hillside section: (a) and (b), zone II at Wistmans Wood; (c) below Crow Tor.

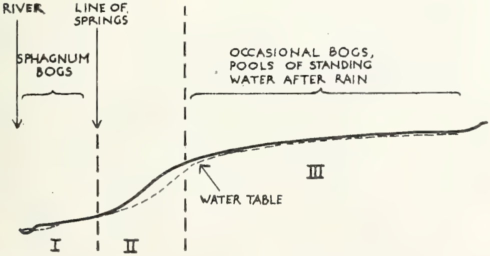

FIGURE 3. Drainage at Wistmans Wood showing the distribution of surface water and the supposed position of the water table.

DRAINAGE

The distribution of surface water is summarised in Fig. 3 and the presumed water table is also shown, diagrammatically. The significance of the observations on the origin of clitter is that in zone II free downward drainage would be permitted. Any suggestion that gradient alone might be sufficient to improve drainage substantially here is contradicted by the presence of *Sphagnum* bogs on the steep slopes of the Beardown opposite the wood.

DISCUSSION

Under moorland conditions in Britain the distribution of bracken is commonly limited by exposure and soil moisture (Tansley 1949) and this appears to be the case at Wistmans Wood. In zone I plants are small and infrequent except on well-drained sites, while the furthest extent into zone III is reached in sheltered depressions above and beyond the northern wood fragment. The greatest development of bracken is of course under the well drained conditions of zone II. The frequency of gorse in zones II and III tends to vary with that of clitter; in zone III plants are dense and compact rarely exceeding 18 inches (45·7 cm) in height with many dead branches but in zone II erect specimens up to 30 inches (76·2 cm) high are found. *Ulex* is absent in zone I from waterlogged areas and is commonest on the river bank where drainage is good. Again distribution illustrates the importance of the exposure and drainage factors. Further evidence for good drainage in zone II is provided by the presence there of the heath species *Galium saxatile* and *Potentilla erecta.* The relations between *Ulex* and *Pteridium*, and between *Ulex* and clitter are not clear.

Above the main wood oak trees are found at more than 1400 ft (424·6 m) to the north-east (presumably the trees in Tansley's photo 50), and there are two oaks amongst clitter east of the central portion of the wood at *ca.* 1450-1470 ft (439·8-490 m), which do not appear to have been noticed before. They barely reach above the rocks but have girths of about six inches. Tansley followed Worth (1922) in suggesting the main factors determining the position of the wood to be protection from grazing and wind afforded to seedlings by the clitter. However the presence of trees above the wood itself and the fact of Black Tor Beare reaching more than 1500 ft (455 m) indicate that simple exposure is not strictly limiting. Grazing cannot be a major factor as sheep enter the wood, and above Black Tor Beare there is a scrub of seedling oaks which survive without the protection of clitter. Therefore it is concluded that the most important agent confining the main stands of trees within zone II is drainage.

This may also explain the zonation of *Quercus* species on Dartmoor. Godwin (1956) noted the occurrence of *Q. petraea* on the flanks of the moor and *Q. robur* towards the centre, and Simmons (1965) describes a transition from *Q. petraea* on metamorphic rocks to *Q. robur* on the granite in the Black Tor Beare area. This and Wistmans Wood, together with the north part of Piles Copse and the head of Holne Chase, represent the *Q. robur* zone, to which can be added a new record of a single pedunculate oak on clitter in Tavy Cleave. Examples of sessile oakwoods of the peripheral zone are Yarner and Hallstock woods, the Teign Valley, trees near Black Tor Beare and the lower parts of Holne Chase and Piles Copse. Beyond, on the clays of lowland Devon, *Q. robur* is the most likely native species. If drainage is a limiting factor for oak on the moor *Q. robur* is in fact the better adapted to inner moorland conditions, being typical elsewhere of heavier and hence more poorly drained soils, and extending further north in Scandinavia than *Q. petraea* (Jones 1959).

Mention should be made of a possible historical factor which is also noted by Simmons (1965). This follows Beirne (1952) who postulated glacial refuges off the present British coasts for some insects with south western distributions, and such refuges have been discussed by Lindroth (1949) in Scandinavia. On this basis the present Dartmoor zonation of oak species would require post-glacial expansion in Britain from the south east, first by *Q. petraea* followed by *Q. robur*, with an early extension by the latter from south western refuges in order to colonise the moor before the arrival of *Q. petraea*.

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NEOTINEA INTACTA (Link) Reichb.f. IN THE ISLE OF MAN

D. E. ALLEN

In the spring of 1966 Miss M. Quilleash, of Ramsey, noticed a patch of unfamiliar small, white-flowered orchids growing on The Ayres, a stretch of fixed dunes which fringes the far north coast of the Isle of Man (vice county 71). Her first thought was that this might be *Dactylorhiza fuchsii* subsp. *okellyi*, the whitish-flowered race of Spotted Orchids recently reported from a number of localities in the island (Allen, 1963). She refrained from collecting a specimen, however; and it was not until the end of May, 1967, that the chance arose of showing the plants *in situ* to members of the Field Section of the Isle of Man Natural History and Antiquarian Society. Dr L. S. Garrad, of the Manx Museum, who happened to be in this party, at once saw that they might well be *Leucorchis albida*, a species conspicuously absent from the Manx list and long expected to be found. She accordingly sent a fresh spike to the Kew Herbarium and, simultaneously, to Mr V. S. Summerhayes, who has visited the island twice in recent years and has since maintained a special interest in its orchid flora. Upon dissecting his specimen, Mr Summerhayes found, to his astonishment, that the species was not *Leucorchis albida*, as he too had at first suspected, but without doubt the hitherto exclusively Irish and Mediterranean species *Neotinea intacta*.

The patch in question (in 10-kilometre square 25/40) consists of at least twenty spikes scattered over an area of some 30 square feet on the landward, south-east-facing slope of the outermost ridge of the dunes some 50 yards from high-water-mark. A careful search in May, when the plants were still in flower, failed to disclose any further specimens for at least half-a-mile in both directions, despite an abundance of apparently identical ground. There is, in fact, nothing seemingly at all remarkable about the particular slope on which the patch occurs and there would appear no reason why the species should not be more widespread. The dunes at this point are low and exposed (though the slope itself is moderately shielded from the prevailing wind, from the west-south-west), apparently only slightly calcareous, well-fixed and with very little *Ammophila* present, grading rapidly into sandy heathland (cf. Moore, 1931). These landward slopes of the outermost ridge are also noticeably favoured by *Orchis mascula*, and it may be that a particular combination of edaphic conditions and shelter renders it especially suited to certain species of orchid.

The following list of associated species was made by the writer in August, when only dead spikes of *Neotinea* were still to be seen:

Festuca arenaria	a	*Galium verum*	o
Anthoxanthum odoratum	c	*Jasione montana*	o
Ononis repens	c	*Pilosella officinarum*	o

Aira caryophyllea	f	*Plantago coronopus*	o
Carex arenaria	f	*Thymus drucei*	o
Plantago lanceolata	f	*Anacamptis pyramidalis*	r
Rosa spinosissima	f	*Trifolium repens*	r

In its Irish localities *Neotinea intacta* is characteristic of limestone country, where it occurs in a great range of habitats and appears capable of withstanding even heavyish grazing. Off the limestone it is rare, but it does also occur on calcareous sea sands and in a few places on light, semi-peaty soils overlying acid rocks (Summerhayes, 1951). In the Mediterranean region, on the other hand, it is not uncommon on non-calcareous rocks. The Isle of Man habitat is thus, while untypical, by no means without parallel elsewhere.

The question inevitably arises: How long has the plant been in this locality—and indeed in the Isle of Man as a whole? It is, as usual, extremely difficult to provide an answer. This particular stretch of The Ayres can certainly be regarded as comparatively well botanised, especially by Miss M. B. Bing, of Andreas, who has walked over it a great deal in recent years in all seasons and who could be counted on to notice an orchid so novel in appearance as *Neotinea*. At the same time the rather inconspicuous nature of the spikes combined with the unusually short and early flowering period (more or less confined to May) can hardly have made discovery of the plant all that inevitable. It is indeed quite conceivable that, even if a patch of the present impressive dimensions is relatively recent in origin, odd specimens may have occurred sporadically on these dunes over a very long period, perhaps appearing only in certain years when conditions happened to prove exceptionally favourable. In such cases the chances of just a single isolated specimen being seen would obviously, by comparison, be minimal.

There is one incontrovertible piece of evidence, however, that prevents an 'old native' interpretation being carried beyond a certain point. This is the fact that The Ayres lie to the seaward of the 25-foot raised beach and thus constitute a clear addition to the coastline since the attainment of the maximum of the post-glacial marine transgression, which recent research suggests occurred early in pollen zone VIIa—radiocarbon-dated to not long after 4000 B.C.—so far as the more northerly parts of the Irish Sea area are concerned (Smith, 1959; Morrison & Stephens, 1960; Oldfield, 1960). Unless the species occurred in suitable habitats elsewhere in Man—and very few of these can ever have been available, in view of the almost complete absence of calcareous soils—and subsequently immigrated into the developing dune system, it must be assumed that colonisation of the island has taken place at some more recent date. It must be borne in mind, moreover, that the climatic conditions that prevailed for several centuries after about 1100 B.C. were considerably more adverse than those obtaining today and these can scarcely have proved very tolerable to a species so evidently 'Mediterranean' in its temperature proclivities.

Long-range colonisation from Ireland, conceivably on more than one occasion, is not too far-fetched a hypothesis to propound in this particular instance. The extreme lightness of orchid seeds, it is well known, allows them to be carried by winds and aerial currents over very long distances; and it is not without significance that the Isle of Man lies straight in the path of the prevailing wind which sweeps across from the areas containing the *Neotinea* populations in the west of Ireland. The nearest-known Irish station, in Co. Offaly, is some 170 miles distant, a journey which for an orchid seed can hardly be regarded as excessive in the light of other cases known—of which the apparent colonisation of North Devon from across the Bristol Channel on the part of *Liparis loeselii* (Willis, 1967) happens to be one very recent and particularly convincing example.

If transmarine immigration, at some date long subsequent to the post-glacial insulation of Man, be assumed, the discovery of *Neotinea* in this new area ceases to have much relevance for the per-glacial survival controversy that has long revolved around the celebrated 'Lusitanian' element. Two recent discussions of this problem specifically with reference to *Neotinea intacta* have ended in quite opposite conclusions. Summerhayes (1951) has argued that the absence of the species from Brittany, south-western England and counties Kerry and Cork bespeaks its survival in Ireland more or less *in situ* since one or more of the warm interglacial phases or periods. Perring (1963), in contrast, is prepared to discount the absence from the intervening areas (where, in any case, as he points out, it may well once have occurred and since become extinct), especially in view of the long-distance dispersal possibilities in orchids, and suggests that the species reached Ireland along with *Arbutus unedo* during the Boreal Period, a time when summer temperatures were significantly higher than at present. In so far as the Manx occurrence can throw any extra light in this respect at all, it would seem to support the idea that long-range transmarine dispersal and transient occurrence in intermediate areas are possibly more potent factors than has always been acknowledged.

For the Isle of Man itself, on the other hand, the biogeographical implications of the discovery are profound. In the first place, it has long seemed anomalous that the flora of the island should apparently lack completely the 'Lusitanian' species that are such a speciality of Ireland, despite the similar climate and (to some extent at least) comparable habitats and despite their undoubted representation in the fauna, most notably among the moths (Beirne, 1952). Now, at last, this anomaly is removed. In the second place, equally, it has long seemed strange that the considerable number of species and races to be met with in the fauna that are shared in common by Man and Ireland but not (or scarcely) found at all in Great Britain have no obvious counterpart among the higher plants (Allen & Cowin, 1954). To set against the Irish Stoat, the Irish Dipper and a notable array of lesser creatures, alongside the lately-detected *Dactylorhiza fuchsii* subsp. *okellyi* there can now be ranged a second flowering plant—strengthening still further the view that, in a biogeographical sense at least, vice county 71 could well be more meaningfully numbered H.41.

Lastly, the discovery raises afresh the question whether the Isle of Man and the neighbouring areas bordering on the Irish Sea have recently begun to enjoy a sensible amelioration in their climate. *Neotinea intacta* is only the latest of several species of orchid to have turned up in entirely new parts of the island within the last ten to fifteen years. In 1965 a patch of *Spiranthes spiralis* was found, likewise on The Ayres, many miles to the north of its single previous Manx locality—and rivalling the Sligo station as the northernmost yet known for this species in the British Isles. Single specimens of *Ophrys apifera* have been found on at least two occasions, though never previously recorded for Man. *Anacamptis pyramidalis*, unrecorded on The Ayres before 1923, has lately increased there to a remarkable degree and since 1957 has appeared, furthermore, in several fresh places in the centre and south of the island. All three of these species, significantly, are 'Germanic' in their range and all three therefore, presumably, ultra-sensitive to alterations in climatic trend. It is true that other orchid species without any comparable restriction in their Britannic range—*Orchis mascula* and *Gymnadenia conopsea*—have also evidently increased on The Ayres in the last few years, as has, even more noticeably, *Botrychium lunaria*; and for a likely primary reason for this one need look no farther than the drastic reduction in the rabbit population caused by the recent myxomatosis epidemic. However, the increase in *Anacamptis pyramidalis*, for a start, quite certainly antedated this ecological convulsion. There is, moreover, a considerable body of evidence both from Man and from other areas around the Irish Sea that various other 'Germanic' species have been increasing for quite some time while, correspondingly, various 'Atlantic' species have undergone a spontaneous decline (Allen, 1953). It may be, therefore, that a swing towards rather hotter summers on the average is ultimately the factor to which one must look for an explanation of the appearance in Man, in comparative strength, of *Neotinea intacta*. If this is so, then there would seem to be no reason why from now on the species should not spread.

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THE BRITISH HERBARIUM OF FLOWERING PLANTS AND FERNS AT THE CITY OF LIVERPOOL MUSEUMS

E. F. GREENWOOD

City of Liverpool Museums

The herbarium at the City of Liverpool Museums is being reorganised, so that specimens may be more easily consulted. The reorganisation of the British section has now been completed, and in view of the interest now being shown in local Floras it was thought that a brief indication of the contents of this might prove useful.

John Shepherd was appointed the first Curator of the newly-established Botanic Garden at Liverpool in 1802 and soon started to build up a herbarium to supplement the living collections. John Shepherd was well known as a botanist and horticulturist before he came to Liverpool and he brought with him his own library and herbarium. John Shepherd's herbarium contained plants from the south-west Lancashire sand dunes as well as specimens gathered in Manchester, where he lived for several years, and from Cumberland, his home county.

When John Shepherd died in 1836, his nephew, Henry Shepherd, succeeded him as Curator. Henry continued to add to the herbarium and also re-arranged the collections, in the course of which many of the original labels seem to have been lost. After his death in 1858, however, no further additions were made to the Liverpool Botanic Garden Herbarium.

In 1909 the collection was transferred to the City of Liverpool Museums. At that time it consisted of about 40,000 specimens collected from all parts of the world. Unfortunately the herbarium had received little or no attention since 1858 and in 1909 all but 10,000 specimens had to be destroyed as a consequence of damage done by insects and fungi. No record was kept of the total contents and such Reports of the Botanic Garden as did exist appear to have been destroyed in the 1939-45 war. Nevertheless a number of the records quoted by Hall (1839) in the first *Flora of Liverpool* are supported by herbarium specimens (Stansfield, 1938), but *Centaurium latifolium* (Sm.) Druce, first collected by John Bostock and John Shepherd, is represented by only the remains of two specimens labelled 'Crosby Rabbit Warren 1801'.

In addition to the herbarium now at Liverpool Henry Shepherd also appears to have had a further one of his own. Dallman (1909) states that James Shillito bought the 'Henry Shepherd Herbarium' and Grindon (1858), writing in the *Manchester Weekly Times* on the 10th July 1858, only six months after the death of Henry Shepherd, states that 'The Prestwich herbarium, which fills nearly 160 volumes, contains the beautiful series of specimens prepared by the late Mr Shepherd of the Liverpool Botanic Garden and munificently presented by

Mr Shillito'. Little is known about this collection of Shepherd's, although in a note in the *Lancashire Naturalist* (1913-14), **6**, 368, reporting the Annual Dinner of the Prestwich Botanical Society, it is noted that the chief possession of the Society is its vast herbarium, representing the flora of nearly every country in the world.

Similarly, very little is known about James Shillito. It is known that he lived in Prestwich and that he was for some time under the tuition of Henry Shepherd (Middleton, 1902). He also contributed to the *Flora of Liverpool* in 1850 and its *Supplement* in 1855 (Dickinson, 1851, 1855), but very little acknowledgement has ever been given to his work. Stansfield (1935), says that he was employed as an assistant at the Liverpool Botanic Garden from before 1850 up to 1857. He then emigrated to Australia, where he died in 1899 (de Tabley, 1899). In 1877 the Museum purchased from Mrs Mary Haines a herbarium which was found to be that of James Shillito. In addition to the British specimens collected by him there are a number of plants, especially ferns, collected by other botanists from all parts of the world in the first half of the nineteenth century. These specimens appear to have originated from the herbarium of the Liverpool Botanic Garden.

The herbarium of Henry Shepherd at Prestwich Botanical Society appears to have survived the 1914-18 war, but shortly afterwards the Society ceased to exist. In addition to the herbarium the Society owned a large library. Neither the library nor the herbarium have been traced, but their location would probably bring to light many valuable books and specimens.

Many of the herbaria formed by Liverpool botanists during the second half of the nineteenth century, when the study of the local flora reached its greatest popularity, are now contained in the herbarium at the City of Liverpool Museums. Amongst the most important are those formed by Mrs Swinton Boult, Robert Brown, J. W. Ellis and C. T. Green. Mrs Swinton Boult was one of the first lady botanists of the Liverpool area and was a member of the Liverpool Naturalists' Field Club, the first learned society of the area to admit women members. The collection contains a number of alien plants introduced with ballast, when the roads in Birkenhead were first laid with macadam. Robert Brown was responsible for much of the new *Flora of Liverpool* and its appendices produced by the Liverpool Naturalists' Field Club between 1872 and 1887 (Liverpool Naturalists' Field Club, 1872, 1873, 1875, 1887). The collection forms a valuable record of the Liverpool flora at that time and contains the last known specimen of *Centaurium latifolium* to grow on the Lancashire sand dunes. Colonel C. T. Green was author of the *Flora of the Liverpool District* (Green, 1902, 1933).

In addition to the collections mentioned above formed by Liverpool botanists, the herbarium of the Historic Society of Lancashire and Cheshire, now at the City of Liverpool Museums, also contains a number of Liverpool plants. The herbarium was formed by three young men, W. Bean, F. Brent and T. Sansom, all employed by H. M. Customs. William Bean has been confused with his father, also William Bean (1787-1866), the conchologist and general naturalist of Scarborough. Only plants collected by W. Bean junior are at Liverpool, but at York (YRK) specimens collected by both father and son are to be found. Francis Brent later achieved more prominence for his work on the Devon flora and for his interests in archaeology. Thomas Sansom was a member of several botanical societies and was for a time Honorary Librarian of the Botanical

Society of London before coming north to Liverpool. Plants from Yorkshire and Kent, the homes of these botanists, are included in the Historic Society collection.

More recent acquisitions of herbaria formed of Lancashire and Cheshire material have been those of W. G. Travis, whose county Flora was published in 1963 (Savidge, Heywood and Gordon, 1963), five years after his death, and

TABLE 1

Collection and Collectors	*Collector's dates of*		*Number of Specimens*	*Vice County*
	Birth	*Death*		
*Bailey, C.	14.VI.1838	14.IX.1924	1,500	59 South Lancaster
Boult, W.				
Mrs Swinton Boult	1808 or 1809	17.VIII.1871	1,200	58 Chester 59 South Lancaster
†Brown R.	27.IX.1839	6.IV.1901	1,900	58 Chester
Cheltenham College for Boys			850	33 East Gloucester 34 West Gloucester 36 Hereford 43 Radnor
Miss F. A. and C. J. Bodenham	Fl. mid-19th century			
Montgomrey, A. S.	1843	1922		
Notcutt, W. L.	19.IV.1819	15.IX.1868		
Shubrick, R. I.	Fl. mid-19th century			
*Eaves, D.	1857	?.V.1936	800	58 Chester 59 South Lancaster
†Ellis, J. W.	24.I.1857	20.VIII.1916	2,640	58 Chester 59 South Lancaster
†Frankland, J. N.	10.XI.1902	——	2,500	63 South-West Yorkshire
†Green, C. T.	18.XI.1863	17.IV.1940	1,800	58 Chester 59 South Lancaster
†Harriman, J.	*c.* 1760	3.XII.1831	950	66 Durham 70 Cumberland
†Harrison, W.	*c.*1873	7.XII.1960	900	58 Chester
†Historic Society of Lancashire & Cheshire			1,100	15 East Kent 59 South Lancaster 62 North-east Yorkshire
Bean, W.	1816 or 1817	27.III.1864		
Brent, F.	4.XII.1816	11.VIII.1903		
Sansom, T.	1817 or 1818	22.III.1872		
†Holder, F. W.	8.II.1891	8.VIII.1963	2,500	59 South Lancaster
Liverpool Botanic Garden				59 South Lancaster 70 Cumberland — South Coast
Shepherd, H.	1783 or 1784	14.I.1858		
Shepherd, J.	*c.* 1764	27.IX.1836		
Velley, T.	*c.* 1748	8.VI.1806		
Marsden, P.	Fl. Early	20th century	850	21 Middlesex
†Shillito, J.	Fl. Mid-19th century		1,000	58 Chester 59 South Lancaster
†Travis, W. G.	29.IV.1877	29.III.1958	4,000	59 South Lancaster
†Woodruff, E. B.				
Unknown collector		19th century	1,350	All parts
Miscellaneous				All parts

*Lost in the 1939-45 war.

†Collection catalogue present but scope very variable.

the fine collection of plants, mostly from the Southport district, of F. W. Holder.

The herbarium obtained from the Cheltenham College for Boys was formed by several botanists about whom little seems to be known. Most of the material was collected in the mid-nineteenth century and was later added to and sorted by A. S. Montgomrey.

A damaged herbarium containing 950 specimens formed by the Rev J. Harriman was also recently acquired. Most of the specimens consist of exchange material, but there is a substantial number of specimens from Cumberland and Teesdale. Harriman sent J. E. Smith and James Sowerby the first specimen of *Gentiana verna* to be found in Teesdale, collected by J. Binks in April 1797 (Clarke, 1900), but Harriman's main interest was in lichens and specimens of these from Yorkshire are at Oxford (OXF) (Clokie, 1964).

A valuable recent addition to the herbarium is the collection formed by Norman Frankland. His collecting has been mostly in Yorkshire, but like all the other collections there is a substantial quantity of material collected from all parts of the country.

Table 1 lists the more important contributors to the British Herbarium at the City of Liverpool Museums and indicates the vice-counties from which most specimens were gathered in each collection. Under miscellaneous collections are included plants collected in the Liverpool area from 1795 to recent times. The miscellaneous collections account for a large number of specimens collected from all parts of the British Isles, so that the total number of flowering plants and ferns contained in the British Herbarium is about 30,000.

I am most grateful to D. E. Allen for his help during the preparation of this paper.

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SPIRAL SHOOTS IN THE GREAT HORSETAIL, *EQUISETUM TELMATEIA* Ehrh.

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A stand of the Great Horsetail, *Equisetum telmateia* Ehrh., occurs by the side of a small Cotswold stream in Gloucestershire. Here the colony spreads over the lower part of a sloping field and, by mid-summer, forms a close waist-high sward which crowds out most other tall herbs. This habitat—a sheltered wet slope irrigated by percolating spring-water from a limestone junction in a bank above—is a very typical one for *E. telmateia* in this area. Other horsetails come in towards the bottom of the incline where the water begins to stagnate before being gathered into a small ditch and thence into the stream—*E. palustre* occurring in the wet hollows, sprawling stems of *E. arvense* along the well-drained sides of the ditch, and a few tall unbranched shoots of *E. fluviatile* in the damp gravel beside the stream itself.

In the summer of 1964 several scattered shoots were found within the *E. telmateia* colony which showed an unusual form of growth, and a number were collected for further examination (Fig. 1, A). Several dozen more freak shoots of similar construction continued to re-appear within this colony during each of the subsequent seasons, their peculiar form of growth being sufficiently conspicuous to enable them to be readily distinguished by eye from the large number of normal individuals. The unusual structure of these horsetail shoots warrants further attention, and can briefly be described as follows.

In each, the normal whorled arrangement of the leaf-sheaths and branches, together with the regular alternation of nodes and internodes (which is a feature so characteristic of *Equisetum*) is modified to form a completely spiralised node/internode structure (Fig. 1, B). Hence the leaf-sheath becomes one long, continuous helix, and the branches consequently follow the base of the leaf-sheath in a continuous spiral up the stem. In each specimen, the lower part of the shoot starts off quite normally but sooner or later this structure gives way to the spiral section of the stem, which emerges abruptly out of one leaf-sheath. In some specimens only a short segment of the stem is involved, the stem structure being normal above and below the spiral portion. In most, however, this helical structure continues to the very apex of the shoot, often completing a dozen or more revolutions, with the spirals becoming smaller and tighter until they cease altogether. Sheaths spiralling in both left-hand and right-hand directions seem to occur more or less at random. On one particular shoot the leaf-sheath completed several revolutions in one direction, reverted to normal, executed a number of turns in the opposite direction, and again righted itself to the apex—spirals in both directions thus occurring on the same shoot.

Elongation of the spiral shoots takes place in a manner analogous to pulling

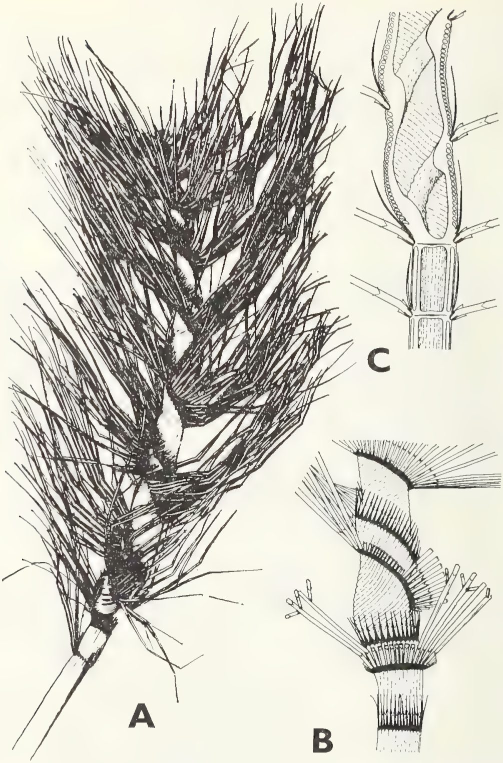

FIGURE 1. A. Drawing of whole shoot (approx. half natural size). B. Detail (branches cut away) showing spiral portion emerging from normal shoot (approx. natural size). C. As in B cut in half longitudinally to show internal structure.

out a roll of paper from the centre. The new intercalated growth forces the spiral node apart, so that the continuous leaf-sheath assumes a steeper and steeper angle. As it does so, the whole shoot is forced to twist slowly about its vertical axis in order to accommodate the new growth. This twisting motion is reflected by the spiral internode's shallow ridge-and-furrow structure, which maintains itself at right-angles to the spiral node, and takes on a conspicuous twist in the opposite direction to that of the sheath. This twisting movement, consequent upon the spiral structure of the stem and the presence of a continuous rigid leaf-sheath, upsets the directional stability of the shoot, so that it often bends from the vertical and comes to lie at an angle to the rest of the stem and to the other members of the colony.

The spiral structure which is visible externally is also reflected in the anatomy. In normal *Equisetum* shoots the stems are hollow, with a septum at each node. In the spiral shoots, however, the rudiments of the septum, though still present, form only a torn spiral band up the otherwise hollow stem corresponding exactly to the position of the spiral node as judged from the outside (Fig.1, C). This thickened band fails to reach even half-way across the hollow stem in the fully grown shoot, so that a single uninterrupted passage is present throughout.

Green branches are borne in a continuous spiral on these freak shoots as profusely as they are borne in regular verticils on the normal summer-shoots of *Equisetum telmateia*. The branches regularly emerge from the base of the spiral leaf-sheath corresponding to the position of the now-spiral node, but are themselves normal in structure. Typically developed alternating nodes and internodes are present, and the branches often bear one or two normal pendant secondary branches from their first few nodes. The branch initials would thus appear to be quite independent of whatever stimulus is the cause of the contortions of their parent stem.

Several records exist in the literature of instances of a spiral form of growth in *Equisetum*. All, however are rare, and seem to refer to stems which occurred but once only as a single isolated shoot amongst normal individuals of the species. As long ago as 1822, Vaucher (1822) recorded a single such shoot of *Equisetum telmateia* in France, and his figure of a shoot of *E. telmateia* bearing only a single long spiral leaf-sheath fits almost exactly these Gloucestershire specimens. Later Duval-Jouve (1864) pp. 151-152, quoted several scattered European records where such spiral growth had been observed in individual shoots of *E. telmateia*, *E. pratense*, *E. palustre*, and *E. fluviatile*. De Vries (1892) devoted extensive consideration to the phenomenon where it occurred in many species of flowering plants which normally bore opposite or whorled leaves (e.g. *Dipsacus*, *Galium*, *Rubia*, etc.) and included mention also of its occurrence in *Equisetum telmateia*, *E. palustre*, and *E. fluviatile*. More recently Schaffner (1927) recorded having found in America shoots of *E. palustre* and *E. laevigatum* in which the leaf-sheath spiralled, and Van Oostroom & Reichgelt (1965) have recently added a single spiral specimen of *E. arvense* to the list. *Equisetum telmateia* seems to be the most frequent horsetail species in Europe in which the phenomenon has been reported (though, on account of its large size, it is also perhaps the most likely species to be noticed), and Schoute (1919) states that in Holland also, *Equisetum telmateia* now and then shows this phenomenon. As far as I am aware, there is no previous record of a horsetail showing this form of growth in the British Isles, though I have, in England, previously encountered single partly-spiral shoots in otherwise normal stands of *E. telmateia* as far apart as Derbyshire and Northumberland, and in a single instance, in a shoot of *E. fluviatile*.

The simultaneous occurrence of a number of such spiral shoots in a stand of horsetails, and, further, their seemingly regular recurrence from year to year in that same colony, is a phenomenon previously unknown. The three other species of horsetail (*E. arvense*, *E. palustre*, and *E. fluviatile*) growing close by the colony of *E. telmateia* and partly intermingling with it, however, here show only the perfectly normal whorled growth typical of *Equisetum*. Further, in several other stands of the Great Horsetail in the surrounding Cotswold area which have been examined, such spiral stems have never been observed. It would seem, therefore, that this phenomenon is more likely to be genetically, rather than entirely environmentally, controlled. It is indeed quite possible that this whole stand of *Equisetum telmateia* represents but a single large vegetative clone, the freak shoots arising from the same rhizomes as do the normal ones. The spiral form of growth seems likely therefore, to be the result of a spontaneous and rather sporadic morphogenetic upset, a potential in any aerial shoot of *Equisetum*, but to which those of this colony seem particularly liable. In this it parallels the many cases of fasciation to be found in flowering plant stems. Fertile shoots have never been found in this colony.

I am most grateful to Dr T. G. Walker for his help in the preparation of this note.

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FURTHER NOTES ON *ERICA CILIARIS* IN IRELAND

DAVID McCLINTOCK

Following Professor Webb's paper on *Erica ciliaris* L. in Ireland (Webb, 1966) there are a few points I might add.

1. All Burgin's and Balfour's specimens of *E. ciliaris* I have seen, for example at the British Museum, Dublin, Edinburgh and Cambridge, are eglandular. My impression in Dorset (kindly confirmed for me by Dr S. B. Chapman at Furzebrook) is that this is the exceptional state, i.e. perhaps 90% of the population is glandular.

2. All the plants now to be seen in Connemara are eglandular. This, being the rare state, provides more presumptive evidence for continuity than if they had been glandular.

3. I noticed this point when I visited this colony in June 1965 and in April 1966. In September 1966 Dr Francis Rose and I carried it further by checking that every one of the plants there is indeed eglandular. Fortunately all the stocks were sprouting strongly.

4. *Erica mackaiana* in fact grows within 50 yards to the east and 150 yards to the west of the station for *E. ciliaris*. This is well to the west of the area shown by Webb (1954). *Erica mackaiana* is still to be seen 600 yards to the east of the *E. ciliaris* site.

5. The heath fire in May 1966 defeated one object of my last visit, i.e., to search for *E.* × *watsonii*. This grows freely in Dorset and Cornwall (and in Devon too?) with its parents, *E. ciliaris* and *E. tetralix*. *E. tetralix* grows freely within a yard of two of *E. ciliaris* in Connemara.

6. Professor Webb told me recently that he had seen no *E.* × *watsonii* there. Perhaps visitors should be warned that a promising looking patch adjoining *E. ciliaris* in the east is in fact *E.* × *praegeri*. The apparent absence of this hybrid would of course be accounted for if local *E. ciliaris* were sterile. This is a point which cannot be effectively observed yet, but would also have an important bearing on the puzzle of the exiguous quantity of this plant in Ireland.

7. Dr Rose and I made four phytosociological analyses of these *Erica* communities west of Craïgga-more, which it is intended to publish elsewhere. These covered the actual patch of *E. ciliaris*, two of *E.* × *praegeri* and one of *E. mackaiana*.

8. Further references to the early searches for this plant in Connemara are:

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p. 221. August 1869. Another search at Craigga-more.
p. 247. The search (the date of which should be 1 & 2 September 1874) with Prof. Dickson, Rev. A. Norman and Prof. J. H. Balfour.
p. 248. Letter dated 17 October 1874 to C. C. Babington about this search.
p. 249. Letter dated 23 February 1878 to C. C. Babington with many further facts and thoughts.
pp. 249-50. Letter dated February 19 1879 'I have never been able to find a trace of *Erica ciliaris*'.
p. 270. August 1878. Sixth and last visit to Roundstone.
p. 316. Monmor Bog record.

Miss M. Scannell of the National Museum in Dublin kindly told me of this last book. The fact that the Linnean Society's copy proved to be uncut also suggests that this work is little known.

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OAK WOODS AND BIRCH WOODS

The following four papers are synopses of ones delivered in connection with the Annual General Meeting of the Society held at Monks Wood Experimental Station, Abbots Ripton, Huntingdon on 29th April, 1967.

BETULA L. IN BRITAIN

S. M. WALTERS

Three species of *Betula* are native in Britain. One of these, the Dwarf Birch, *Betula nana* L., is almost restricted to Central and North Scotland, and is very distinct in its dwarf habit (and in other characters of leaf-shape and inflorescence); although hybrids occur locally with *B. pubescens*, it normally causes no taxonomic difficulty. The tree Birches, however, constitute a difficult taxonomic group which can only be understood on a world scale, and with cytogenetic, experimental study. To some extent we can be said to understand the broad outline of the picture.

It is possible to distinguish generally in Europe between a diploid species *B. pendula* Roth (*B. verrucosa* Ehrh.) with $2n = 28$, and a tetraploid aggregate ($2n = 56$), for which the name *B. pubescens* Ehrh. is best used. 'Pure' *B. pendula* is a tree up to 30 m, with slender, pendent, glabrous twigs beset with resin-glands, smooth silvery-white bark, dark bole with rectangular bosses, subglabrous biserrate leaves and a set of characters of fruit and catkin-scale. 'Pure' *B. pubescens* subsp. *pubescens* is a shrub or small tree up to 20 m with hairy, eglandular twigs not pendent, brownish or greyish bark, without rectangular bosses on the bole, with pubescent, coarsely serrate leaves, and other fruit and catkin-scale characters.

In areas of Europe where the native forest is relatively unaffected by man (e.g. Finland) there is little taxonomic difficulty in distinguishing between the two species, which are ecologically rather effectively separated, *B. pubescens* growing in wetter ground. In Britain, however, most Birch populations are secondary—Holme Fen is an excellent example—and many individual trees can be found with somewhat intermediate characters. The interesting questions relate to the nature and origin of these intermediates.

Johnsson (1944, 1945, 1949) gives an account of cytogenetic investigations in Sweden which, though incomplete, throw a good deal of light on the problem. It is extremely difficult, but not impossible, to produce a triploid F_1 hybrid ($2n = 42$) between *B. pubescens* and *B. pendula*; this plant is apparently completely female-sterile, and such plants have been found in nature. Some natural triploids with $2n = 42$ are not, however, the hybrid (which has obvious *B. pubescens* characters), but rather autotriploid *B. pendula*, differing mainly from the diploid in quantitative characters and sterility. Crosses involving the North American *B. papyrifera* threw some light on the micro-evolutionary relationships of the species; it seems likely that *B. pendula* (or other diploid taxa such as *B. japonica* Sieb., which is interfertile with it) is one parent of both the tetraploid *B. pubescens* and the hexaploid *B. papyrifera* ($2n = 84$).

The interesting question is: what is the other likely diploid parent involved in *B. pubescens*, or should we look for more than one to explain some of the enormous variability in the tetraploid? On purely morphological grounds the Central and East European shrub *B. humilis* Schrank is an obvious candidate; but, so far as I am aware, no genetical work has yet been done involving this species.

Cytological investigation of apparently hybrid populations in Britain could throw much light on the nature and extent of introgression from diploid to tetraploid, and the efficiency of isolating factors such as differing ecological preference, flowering time, etc. It is possible to get mitotic counts from young leaves (Skalińska *et al* 1959) so that some progress can be made in determining whether individual trees are triploid or not. Any 'hybrid-index' analysis of the field populations (cf Natho 1959) suffers from the severe disadvantage that our 'pure' reference-points are subjective . . . indeed, if some introgression is possible and if the tetraploid has a polytopic origin, we may be pursuing a will-o-the-wisp in looking for 'pure' *pubescens* at all!

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ECOLOGY OF BIRCH WOODS

J. W. KINNAIRD

INTRODUCTION

Birches (*Betula pendula* Ehrh. and *B. pubescens* Roth.) are probably the commonest trees in Britain. They are found in a wide range of habitats throughout the country, due in part to the readiness with which they colonise felled woodland. *B. pendula* has a southern and eastern bias to its distribution, becoming less common north of the Great Glen, whereas *B. pubescens* has a northern and western bias.

Both species have a life span of about one hundred years; after an early period of fast development, growth is slow, terminating in a decline that is commonly rapid due to fungal decay. Although they grow best on freely drained, fresh moderately fertile soils, they do tolerate infertile soils. *B. pendula* is associated with rather drier soils and *B. pubescens* with moist to wet and frequently peaty sites. The distinction, in this respect is clearly demonstrated on some of the heaths of S.E. England where segregation of *B. pendula* to well-drained sands, and *B. pubescens* to rather wet peaty depressions is marked. Both species are light demanding, though *B. pubescens* is less so than *B. pendula*. Relative to other tree species, they produce abundant seed.

Essentially the birches are pioneer tree species with a wide ecological range, and in most sites may be rapidly displaced by the successional species, where present.

STRUCTURE OF NATURAL AND SEMI-NATURAL BIRCH WOODS

A feature of most birchwoods is the almost complete absence, under the canopy, of young birch, apart from a few seedlings, and even in gaps of the canopy of up to about 45 feet diameter. This is all the more striking as birch can establish itself in the shade of other tree species. Consequently birchwoods regenerate on suitable adjacent ground.

An examination of the structure of the semi-natural birchwoods of the Highlands is informative. There is normally an overall uniformity in development suggesting that the wood is largely even-aged, or at least consists of a series of large even-aged blocks. Less commonly a single, open-grown tree or small group of trees is surrounded by a swarm of younger trees, all much the same age. Rarely a series of concentric rings of successively younger trees from the centre outwards will occur, with distinct areas devoid of tree boles between each ring.

It is apparent that in these situations conditions for germination, or for seedling growth of birch, or both, suddenly become favourable either locally or extensively.

Regeneration depends on the vigour of the birch seedlings and is affected by the grazing intensity. There seems to be a build up of seedlings either over a long period of gradual colonisation, as suitable seed beds occur due to localised disturbance of the site, or suddenly, after a major disturbance of the habitat, e.g. by fire. The successful regeneration of a birchwood, i.e. the establishment of seed bearing trees, depends on an adequate number of seedlings sufficiently vigorous to compete successfully with grazing. Where grazing is heavy, and seedling vigour is relatively low, regeneration is not achieved. But with large seedling numbers, and, of the greatest importance, with high seedling vigour, establishment can occur even where grazing is heavy. Vigour is a function of soil fertility, but on some poorer sites may also be dependent on the successful establishment of a mycorrhizal association.

While the cessation or reduction of grazing can release established birch seedlings, the reduced disturbance of the ground due to a lack of trampling by animals may reduce the number of spots suitable for birch seed germination.

Birch produce seed relatively abundantly but with a periodicity of production whereby a good seed year is followed by several years of low production. This variation in production could be a critical factor affecting regeneration particularly in marginal sites, where seed bed conditions for germination and early growth are less favourable. Under these conditions it seems that seed dispersal beyond about twice the height of the trees is unimportant. Where grazed, the regeneration period in this poor type of birchwood may be from 20-30 years.

In the north of Scotland the succession to birch is not clear; the normal succession species e.g. oak (*Quercus* spp.) and Scots pine (*Pinus sylvestris*), are either absent or are so sparse as to be ineffective as seed sources. It seems that birch rarely succeeds birch immediately, although it will more readily succeed in felled birch wood. Birch will subsequently recolonise these areas often in conjunction with *Calluna vulgaris* or *Erica tetralix*, but should these dwarf shrubs become established without birch, birch will rarely colonise except where the ericaceous canopy is broken. Both grazing and regular burning will have a modifying effect, the former by lengthening the grassy phase, and the latter by causing physical damage to, or the death of the birch, so prolonging the ericaceous phase.

BIRCH ON FELLED WOODLANDS

The birchwoods most commonly seen in Britain have arisen following the felling of woodlands of all types, on soils ranging from highly fertile, moist, base rich loams, to infertile dry acidic sands. The conditions following felling are obviously highly suitable for colonisation by birch. Briefly these are (1) surface vegetation disturbed; (2) mineral soil loosened and mixed with the litter and humus; (3) the soil moisture regime diversified; (4) soil temperatures increased by more sunlight; (5) accelerated mineralisation of the soil organic matter. In short, conditions are created which are favourable to the germination and fast early growth of any species capable of exploiting the situation. Provided seed bearers are adjacent, birches are the tree species most able to do this, due to the relative abundance of their seed. The species of birch to colonise the ground will be that species which is adjacent. In these woods the ground vegetation and the shrub layer, if there is one, will be largely characteristic of the former woodland, to which the birchwood will tend to revert in time, provided a seed source is adjacent.

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THE TAXONOMY OF THE BRITISH SPECIES OF *QUERCUS*

E. W. JONES

All species of *Quercus* are variable; of the two British species *Q. robur* (pedunculate oak) is more variable than *Q. petraea* (sessile oak). The two species hybridise, but artificially produced hybrids have never been raised beyond the juvenile stage, nor are there any criteria by which natural hybrids can be recognised with certainty, except when they are partially sterile. It is scarcely possible to find populations of either species that are so isolated from other species of *Quercus* that the possibility of their being influenced by introgression can be excluded, and which would therefore give us an objective measure of the intraspecific variation. Thus how much of the variation that we find is attributed to introgression between the two species and how much is attributed to normal intraspecific variation is fundamentally a matter of personal opinion; we can certainly attribute much to introgression if we wish (Cousens, 1962, 1965). I take a broad view of the species because (a) considerable genetical variation is normal in populations of trees such as oak, which are more or less self-sterile and reproduce only sexually, and (b) it is more useful practically if names indicate groups of individuals that resemble each other in general appearance and behaviour rather than individuals that resemble each other in some hypothetical ancestry.

Graham and Don introduced much confusion into the accounts of the species in British floras, partly—no doubt—because they studied oaks in Scotland where pedunculate oak seems to be far less distinct than in England. Cousens (1965) has recently studied populations quantitatively, thus confirming the general picture, and giving greater precision to some of the critical distinguishing characters.

In the following comparison of the two species P and S stand for pedunculate and sessile oak respectively; characters of greatest taxonomic value are in capitals, somewhat less valuable characters in italics, and characters which, though useful, are less reliable, are in lower case roman type. Leaves from lammas shoots are often very atypical; to a lesser degree leaves from epicormic shoots and from young plants are also liable to be atypical.

PEDUNCLE: **P**, usu. 15-60 mm. long to lowest bract, and $<1{\cdot}5$ mm. diam. (Cousens, 1965); glabrous.
S, usu. 0-4 mm long to lowest bract, and $>1{\cdot}5$ mm diam., bearing some clustered hairs.

Cupule: **P**, scales closely imbricated, flat.
S, scales looser and somewhat tumid.

COLOUR OF RIPE ACORN: **P**, vertical bands of fawn and dark olive brown (lost on drying).
S, uniform brown.

Leaf shape and venation: **P**, 3-4 deep lobes on either side, the lobes and veins spreading at a wide angle; frequent veins to sinuses as well as to lobes.

S, 4-6 shallow, rather regular lobes on either side, the lobes and veins at a narrower angle to the midrib, sinus-veins rare.

LEAF AURICLES: **P**, sharply delimited, directed backwards so that they lie close to the petiole (cf. Cousens 1962).

S, very variable, leaves with and without auricles often on the same shoot; auricles, when present, not sharply delimited from the lamina, and spreading ± at right angles to the petiole.

INDUMENTUM ON LOWER SURFACE OF LEAF: **P**, completely glabrous, or more rarely, with a few simple hairs.

S, minute stellate hairs on lamina; these hairs vary greatly in abundance, and often cannot be seen without a good lens. Also very characteristic but less constant are the longer clustered hairs on the veins, forming conspicuous axillary tufts.

PETIOLE: **P**, short— 2-6% of the length of the lamina (Cousens 1965).

S, long— 9-15% of the length of the lamina.

Twigs and branches: **P**, twigs short, slender, branches irregular.

S, twigs longer and stouter, branches straighter.

Buds: **P**, small, ovate, blunt.

S, larger, pointed.

Bark of mature tree: **P**, rather solid, with well-marked deep longitudinal fissures,

S, rather scaly, with less pronounced longitudinal and numerous transverse fissures.

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THE ECOLOGY OF SOME WESTERN OAKWOODS

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INTRODUCTION

This account is based on work carried out while developing a technique for recording the flora and structure of woodlands. The Oakwoods described are Camlyn, Cymerau and Rhygen National Nature Reserves in Merionethshire; Johnny's Wood and Seatoller Sites of Special Scientific Interest in Cumberland; Inchcailloch in the Loch Lomond National Nature Reserve, Stirling and Dunbartonshire; and Arriundle Forest Nature Reserve in Argyllshire.

DESCRIPTION OF OAKWOODS

Camlyn Oakwood lies between 50 feet and 500 feet on a north-west facing, uniformly steep, slope overlooking the Vale of Ffestiniog and has an estimated rainfall of 70 inches annually. The shallow, acid soils derived from the Penrhos shales of the Upper Cambrian which underlie the area bear vegetation dominated by Sessile Oak (*Quercus petraea*) with a good deal of Birch (*Betula pubescens*). The trees range in height from about 60 feet on the lower slopes to 15 feet on the upper edge of the woodland. Over most of the area the ground vegetation consists mainly of *Vaccinium myrtillus* together with *Deschampsia flexuosa* and *Molinia caerulea*. In gaps, or where the canopy is more open, *Calluna vulgaris* becomes common. Mosses occur extensively and the most common species are *Rhytidiadelphus loreus*, *Thuidium tamariscinum*, *Hylocomium splendens* and *Dicranum majus*. *Blechnum spicant* and *Pteridium aquilinum* were also very common, although *Pteridium* is only locally dominant. Shrubs are scarce and represented by Rowan (*Sorbus aucuparia*) with some scattered Hazel (*Corylus avellana*).

Cymerau Oakwood also lies on the edge of the Vale of Ffestiniog and has a similar altitudinal range from about 50 feet to 500 feet. Conditions are more varied here than at Camlyn as the slopes are more broken and have a wider range of aspects, and the rainfall is higher at an estimated 80 inches per annum. The soil is often little more than a stabilised scree covered by a thin layer of raw acid humus but there are areas with a brown, podsolic type of soil. As in Camlyn the woodland is dominated by almost pure Sessile Oak with few shrubs, except for some scattered Rowan and Hazel. Much of the ground is covered only with litter but there are clumps of mosses such as *Rhytidiadelphus loreus*, *Polytrichum formosum*, *Mnium hornum* and *Dicranum majus* and scattered plants of *Deschampsia flexuosa* and *Pteridium aquilinum*.

Rhygen National Nature Reserve is on the south side of Trawsfynydd

Reservoir and has a mainly north-east aspect and an estimated rainfall of 90 inches annually. The woodland lies between 625 feet and 850 feet and although, like Camlyn and Cymerau, it is dominated mainly by Sessile Oak there is a greater admixture of *Betula pubescens* particularly in the north-west. The slope is less steep and more broken than previously described and the block-strewn ground has a vegetation composed mainly of mosses such as *Rhytidiadelphus loreus*, *Isothecium myosuroides* and *Hypnum cupressiforme*, with *Oxalis acetosella* also occurring commonly. In such areas there is little or no soil but, where pockets of soil occur, *Anthoxanthum odoratum*, *Agrostis canina*, *Galium saxatile* and *Pteridium* are common. Flushes contain mainly species of *Carex*, *Juncus* and *Sphagnum*. This woodland is very rich in bryophytes.

Johnny's Wood and Seatoller are both in Borrowdale in the Lake District. The rainfall here varies considerably over short distances, but Johnny's Wood probably has an annual rainfall of about 95 inches and Seatoller may get up to 130 inches annually. Both woodlands have much the same altitudinal range; Johnny's Wood extends from 300 feet to 800 feet, and Seatoller from 400 feet to 850 feet. The lower, less steep, south-facing slops of Johnny's Wood carry well-grown Sessile Oak with a ground vegetation dominated by *Pteridium*, *Anthoxanthum odoratum*, *Agrostis canina* and *Galium saxatile*. *Rhytidiadelphus loreus*, *Hylocomium splendens* and *Hypnum cupressiforme* are also very common. The other main aspect is north-east where the slopes are steeper and the ground is more broken and here, as in Cymerau, the soil is often little more than a stabilised scree with a thin cover of acid raw humus. Here also, as in Cymerau, much of the soil is covered only with litter, with clumps of *Polytrichum formosum* and *Mnium hornum*, together with some *Pteridium* and *Deschampsia flexuosa*. The more stable block litter bears a luxuriant growth of bryophytes including many oceanic and rare species. In common with most of these Sessile Oakwoods shrubs are scarce and here are represented by Rowan, Hazel and some Holly (*Ilex aquifolium*).

Seatoller Wood has only one major aspect, south-east, but it is a far more varied woodland type than Johnny's Wood because of the better nutrient status of some of the underlying rock. In the south-east the woodland is similar to that on the south aspect of Johnny's Wood but elsewhere the tree and shrub flora is much richer. Ash (*Fraxinus excelsior*) and Wych Elm (*Ulmus glabra*) are common and species such as Hazel, Holly, Hawthorn (*Crataegus monogyna*), Rowan and *Prunus padus* occur frequently and there is some Aspen (*Populus tremula*). The ground vegetation too reflects the better nutrient status of the soil and species such as *Filipendula ulmaria*, *Sanicula europaea*, *Chrysosplenium oppositifolium*, *Cardamine flexuosa*, *Geum urbanum* and *Fragaria vesca* are locally abundant.

The island of Inchcailloch is at the south end of Loch Lomond. It has a rainfall of about 57 inches annually and ranges in altitude from loch level at about 25 feet to 278 feet. Most of the island is underlain by Lower Old Red Sandstone but there is a complex band of Dolomite fault rocks running through the island from north-east to south-west which give rise to soils of a richer nutrient status. Most of the woodland on Inchcailloch is dominated by Sessile Oak but Alder (*Alnus glutinosa*) and Ash are dominant in the flushes. The ground vegetation is varied and may be locally dominated by *Pteridium*, *Rubus fruticosus* L. agg., *Luzula sylvatica*, *Calluna vulgaris*, *Erica cinerea*, *Vaccinium myrtillus*, *Holcus mollis*, *Deschampsia flexuosa*, *Lonicera periclymenum*, *Mercurialis perennis* or

Urtica dioica. In the flushes *Ranunculus ficaria* often forms a dense mat and usually occurs together with *Dryopteris* spp. On base-rich sites *Allium ursinum* may become locally dominant. In common with the other Sessile Oakwoods, except Seatoller, shrubs are not well represented although Hazel, Hawthorn, and Rowan occur. As is often the case in these western Oakwoods there is a rich bryophyte flora.

The most northern of the woodlands included in this account is Arriundle Forest Nature Reserve. It is generally comparable to Camlyn and Cymerau in its altitudinal range of 150 feet to 600 feet and its nutrient-deficient soil, but has a higher rainfall estimated at about 100 inches annually. Sessile Oak is the dominant tree species but there are a few Ash, Alder and Wych Elm. The ground vegetation consists mainly of mosses such as *Pleurozium schreberi*, *Rhytidiadelphus loreus*, *Dicranum majus*, *Hylocomium splendens* and *Polytrichum formosum*, but *Deschampsia flexuosa*, *Blechnum spicant* and *Potentilla erecta* also occur commonly throughout the area. Hazel and Rowan are sparsely present.

DISCUSSION

The Sessile Oakwoods described here on nutrient poor and acid soils contain few other tree species except *Betula pubescens* which may be more or less common. Where the base status is improved, as at Seatoller or Inchcailloch, other trees such as Ash and Elm become more common. Shrubs are also poorly represented in most of these woodlands, although Hazel and Rowan occur in all of them, but again under the better nutrient conditions of Seatoller and Inchcailloch, other species such as Hawthorn, *Prunus padus* and Aspen occur. Concentrations of shrubs, especially Hazel, often occur below cliffs and rock faces and this may indicate local enrichment of soil nutrients by seepage. Regeneration of both tree and shrub species is poor. Seedlings are usually present, sometimes in numbers, but saplings are rare. This may be due to grazing but equally may be because the environment generally is unfavourable to seedling development.

On the acid and thin soils the ground vegetation is often one of four broad types. Litter and bryophytes may cover much of the ground as in Cymerau or a *Pteridium*/grass community may develop as in parts of Johnny's Wood. The third broad category is dominated by *Vaccinium*, or in less shaded areas by *Calluna*, as in Camlyn. Where the soil is richer in nutrients such as on Inchcailloch there is a more diverse flowering plant component and bryophytes become less prominent in the ground vegetation.

It is tempting to ascribe the differences in the relative abundance and dominance of species to soil and climate but this must be done with caution. For example *Luzula sylvatica* occurs more extensively on Inchcailloch than in the other woodlands described. This species is very palatable to sheep so the absence or scarcity of *Luzula sylvatica* in the other woodlands may be because they have been more heavily grazed by sheep in recent years than Inchcailloch. Similarly the abundance of other plants may be just as much related to differences in past land usage as to variations in the soil and climate.

ACKNOWLEDGEMENTS

I am most grateful to D. A. Ratcliffe, A. J. Kerr, and A. D. Horrill who helped in obtaining the records presented here.

PLANT NOTES

209/c Spiraea chamaedryfolia L. 1753; *S. ulmifolia* Scop. 1772; *S. chamaedryfolia* var. *ulmifolia* (Scop.) Maxim. 1879.

A freely suckering shrub up to about 1·5 m tall, with angular glabrous twigs. Leaves ovate, 2·5-5 × 1·5-2·5 cm, acute, cuneate or rounded at the base, sharply incised, bright green and glabrous. Flowers white in many-flowered umbels about 3 cm wide on leafy shoots. Petals orbicular, shorter than the stamens, sepals reflexed.

V. c. 90. Angus; By Isla Water, and increasing, Den of Airlie. Nat. Grid. 37/292522. June 7, 1966, Miss U. K. Duncan (Herb. Lousley & Herb. Duncan).

Specimens were sent to me by Miss Duncan for identification with the comment 'It grows by the river in a river ravine or "den" (which is the local name), having been originally planted, I'm sure, but now caught on well and spreading'. In gardens it spreads rapidly from suckers, and from its behaviour in other countries, such as Germany and Austria (where it is also native), it may be expected to persist and extend its ground when introduced to suitable habitats. The inclusion of the species in the first edition of the *List of British Plants* (Druce, 1908) appears to be based on a specimen collected by Baxter in a hedge at South Hinksey, Berks., in 1830 (Druce, 1897) but there is no evidence that it persisted or extended its ground there. The species was introduced to Britain in 1790.

S. chamaedryfolia is a variable species with a wide range. The typical species from Siberia has smaller leaves and flowers than described above and the leaves are less deeply incised. *S. ulmifolia*, which is the plant collected in Angus, has a wide range from S.-E. Europe to N.E. Asia and Japan. It seems likely that careful examination of sufficient material would reveal a cline extending across northern Asia.

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—J. E. Lousley

239/r Saxifraga rotundifolia L.—a well established alien in Britain.

The recent confirmation by D. McClintock, R. Mackechnie and A. McG. Stirling that this species still persists, and is spreading in quantity in competition with native plants, in the Stirlingshire locality where it was first found in 1923, would seem a suitable opportunity to review its history in Britain. *S. rotundifolia* was fraudulently claimed as wild in the Lake District in the early part of the 19th century, and is now restored to the list of established members of our flora.

This species is widespread as a mountain plant in Europe and it occurs in the Alps, Pyrenees, Apennines, mountains of Corsica, Sardinia and Sicily, in the Carpathians, Balkans and Asia Minor. In Belgium it has been naturalised on humid north-facing wooded slopes near Roly since before 1851 (Lawalrée, A., 1955, *Flore générale de Belgique, Spermatophytes*, vol. **2**, p. 458. Bruxelles). It has been grown in Britain since 1596, and thrives in moist, shady habitats in the north. It has been recorded as follows:

V. c. 64, Mid-west York.; Naturalised in Holden Clough near Bolton-by-Bowland, 1963, Mrs F. Houseman (Herb. Lousley).

V. c. 68, Cheviotland; Lorbottle, in a wood, 1875, Mrs Roper (coloured drawing in Herb. Mus. Brit. (BM)).

(V. c. 70, Cumberland; Causey Pike Gill, Wright, 1837 (CLE); Causey Pike Gill, C. Stevens ex Henslow (CGE); Causey Pike Gill, Miss Wright, 1843 (CGE); Smelt-Mill Gill, Newlands near Keswick, 1842, C. H. Wright (CGE). These records are fraudulent—see below.)

V. c. 83, Edinburgh; Auchendinny, Young (E).

V. c. 84, Linlithgow; Binny Crag, 1872 (OXF). (At about this time several garden species were recorded from a wood at Binny Crag, Ecclesmachan which appears to be the same locality—*Notes R. bot. Gdn. Edinb.*, **2**, 424, (1902)).

V. c. 86, Stirling; Sides of Fin Burn N. of road from Campsie to Strathblane, 1923, R. Grierson (OXF. & *Rep. botl. Soc. Exch. Club Br. Isl.*, **7**, 184, (1924)); Naturalised on side of Fin Burn at Strathblane Road (86b), 1923, (R. Grierson in *Glas. Nat.*, **9**, 27, (1931)); Fin Burn, Campsie (Lee, J. R. (1933). *Flora of the Clyde Area*, pp. 137-138, Glasgow); In quantity by the Glazert Burn, 1957, C. M. Morrison & R. Mackechnie (R. Mackechnie *in litt.*); rocks & banks, Glazert Water, Campsie, G/R. 655765, 1965, D. McClintock (Herb Lousley—and see below); The Hermitage, Carron Glen, Grierson *in litt.* to G. C. Druce, 1923 (OXF). (The Hermitage is an old house in a deep gorge near Tops Farm between Denny and Carronbridge—it is visible from the iron bridge.)

V. c. 89, East Perth; Wood between Blair Athole & Killiecrankie, F. B. White (White, F. B. W. (1898). *Flora of Perthshire*, p. 141. Edinburgh. Not represented by a specimen in White's herbarium at PTH.)

V. c. H.39, Antrim; Near R. Lagan, Belfast, W. O. Newnham, 1843 (CGE).

I have no further information about the statement in F. Arnold Lees' *A Supplement to the Yorkshire Floras* (1941), that *S. rotundifolia* has occurred as an alien in Yorkshire.

The Cumberland records form part of a series of frauds imposed on visitors by Lake District guides which involved several attractive garden plants alleged to occur wild. In the case of *S. rotundifolia* the story starts with information given to the Rev W. T. Bree by a Mr and Mrs Hutton of Keswick that the plant grew near there, but they admitted that it had been planted (Bree, *Phytologist*, **2**, 74-75 (1845)). In June 1844, Borrer obtained from Miss Wright of Keswick (a daughter of Wright, the guide) a specimen 'gathered by herself, some years since, near the foot of Causey Pike, where it is not now to be found'. She conducted him to the spot 'which is such as to preclude altogether any suspicion that the plant had escaped from a garden' but the saxifrage had been exterminated by Miss Wright herself who gathered fifteen to twenty specimens in two years (Borrer, W. *Phytologist*, **2**, 3-4 (1845)). G. C. Gibson called on Miss Wright who 'employed herself in collecting specimens for sale, etc.' and records that *S. rotundifolia* 'was found a few years ago among the rocks in the vale of Newlands, but has since been searched for in vain'. (*Phytologist*, **2**, 376 (1845)). As H. C. Watson sagely remarked 'If ever found there, it had doubtless been first planted by some of the Keswick guides'. (*Cybele Britannica*, vol. **1**, p. 405 (1847)).

Whereas the fraudulent Cumberland records received considerable publicity and were well represented by specimens, relatively little interest was shown in Grierson's discovery in Stirlingshire. He found the plant in 1923 by the Finglen Burn, near Campsie Glen north of the main road. In 1957, Mackechnie and Morrison found it by the Glazert Burn into which the Finglen Burn drains higher up. The party taken by Mackechnie to see if it persisted in 1965 found it 'in small quantity by the Fin Burn near where it joins the Glazert Water below the main road north-west of Campsie Glen station, and locally in great quantity three miles east of this, by the Glazert Water from Milton for about a mile to the by-road to Kirkintilloch'. The plant has not only persisted for well over forty years but has spread downstream for about four miles. The Hermitage, from which Grierson also reported the species, is about seven miles to the north-east but it is not known whether it spread beyond the garden.

Of the other records in the list, it seems likely that the Belfast plant was a casual, and the remainder associated with large estates where the saxifrage might persist under quasi-wild conditions. The Campsie locality alone justifies its inclusion in the list of established members of our flora.

I am most grateful to R. Mackechnie and D. McClintock for information about the Stirlingshire locality, to Miss M. McCallum Webster for listing the material in the herbarium at Cambridge, and to Miss C. W. Muirhead for a similar service at Edinburgh and Carlisle. —J. E. LOUSLEY.

371/b. TRIENTALIS BOREALIS Raf. 1808, *Med. Repos.* New York, 2, **5**, 354; *T. europaeus* Michaux, 1803, *Fl. Bor.-amer.*, **1**, 220; *T. europaea* var. *americana* Persoon, 1805, *Syn. Plant.*, **1**, 402; *T. americana* Pursh, 1814, *Fl. Amer. Sept.*, **1**, 254.

T. borealis is usually a taller larger plant than *T. europaea* from which it differs mainly in the shape of the leaves. In the American plant the 4-9 leaves in the terminal rosette are up to 8·5 cm long, lanceolate or narrow-lanceolate and narrowed gradually to an acute apex. Any leaves on the stem are reduced to scale-like structures less than 5 mm long. In our native *T. europaea* the leaves are generally smaller and broader, obovate to obovate-lanceolate in the terminal rosette and occasional cauline leaves are to be found much larger than those in *T. borealis*.

T. borealis has been established in Holland in a wood near Apeldoorn at least since 1831 and is believed to have been introduced with American ferns. (van Ooststroom & Reichgelt, *Gorteria*, **2**, 138-140 (1965)). In Britain it occurs as a weed in several places in each of two sets of nurseries: V. c. 16, West Kent, Crown Point Nurseries, Seal, June 1965, D. McClintock and V. c. 11, South Hants., Hillier & Sons' nurseries, Winchester, June 1966, Roy Lancaster (both in Herb. LOUSLEY). It is known to have been unintentionally introduced from one nursery to others, and to have persisted for some years. It seems desirable to put this on record in view of the possibility that it may spread to wilder habitats. —J. E. LOUSLEY

379/2. VINCA MAJOR L.—production of fruit.

Sir Edward Salisbury (1961) wrote that 'Throughout the 400 or more years of their presence here all those who comment upon their reproduction by seed agree that both species [of periwinkle] very rarely fruit in this country.'

The object of his note was to draw attention to the fruiting of both species that year in several English localities, apparently associated with the exceptionally dry summer.

In the autumn of 1966 I had reason to clear a patch of this plant some six feet square on a relatively open slope facing south-east, at my home in Platt, Kent. It had been there to my knowledge, for over 20 years. Ever since then (I write in April, 1967) the area has sprouted seedling periwinkles, many dozens of them. Earlier I had occasionally seen fruit on, and seedlings from, this patch (and on another nearby); but it seems that there must have been plenty of good seed set over the years, which has the capacity of remaining dormant for some considerable time.

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SALISBURY, E. J. (1961), The Fruiting of the Periwinkles, *Jl. R. hort. Soc.*, **86**, 489-90.

—D. McCLINTOCK

490/1. LINNAEA BOREALIS L. var. AMERICANA (Forbes) Rehder—at Seal, V. c. 16.

In June 1965 D. McClintock found *L. borealis* var. *americana* naturalised in two places in Crown Point Nurseries, Seal, West Kent, V.-C. 16. (Herb. LOUSLEY). This variety, which is found over much of North America, is known to horticulturalists as growing much more freely than the typical species from Europe. There would seem to be no climatic bar to it becoming established in Britain, and attention is drawn to it here in case it becomes distributed with trees and shrubs sent out from nurseries.

Although an American plant it was first described from plants in cultivation in this country at Woburn Abbey, Bedfordshire. James Forbes published it as *L. americana* in 1833 (*Hortus Woburnensis*, p. 135) and gave the date of introduction as 1830. He also had *L. borealis* in cultivation. Whereas the corolla in the British plant rarely exceeds 8 mm in length, and the calyx exceeds the tube, in var. *americana* the corolla is 8-15 mm long with the tube exceeding the calyx, and the whole plant is more robust.

—J. E. LOUSLEY

558/2(5). PILOSELLA FLAGELLARIS (Willd.) Sell & C. West subsp. BICAPITATA Sell & C. West—in Zetland. (See Taxonomic and nomenclatural notes on the British flora, *Watsonia*, **6**, 313-4 (1967).)

This species was discovered by the writer in May, 1962 in rocky limestone pasture on the west side of White Ness, parish of Tingwall, Zetland (V. c. 112), but owing to its immaturity no specimen was taken. A second visit was not possible until August of the same year, when a rather withered specimen (herb. W. SCOTT, no. 1202) was gathered. Since the stem was forked a little above the base it was realised that the plant was not typical *Pilosella officinarum* subsp. *officinarum* (*Hieracium pilosella*), a species still unrecorded for the county. The following year (1963) the plant was seen a short distance from the original station, on limestone rocks north-west of Hoove, and a number of flowering specimens obtained. This gathering was divided between CGE and herb. W. SCOTT. During 1964 Mr R. C. Palmer, Mr N. D. Simpson and Dr C. West visited the White Ness locality and examined the plants *in situ*. This year (1967) the writer found the *Pilosella* in two new widely-separated localities, one on dry, rocky, heathy pasture at West Burrafirth, parish of Sandsting, and the other on crumbling granite just above the north side of Ronas Voe, between The Kirk and Slocka, in the parish of Northmavine. At West Burrafirth it was quite common, but at Ronas Voe, and at White Ness it was only sparingly seen. 'Shetland Mouse-ear Hawkweed', if it may be given this name, normally has a forked stem, but quite frequently plants with a single capitulum can be found, and very occasionally a plant bearing three capitula. In all three places the flowering specimens were accompanied by numerous non-flowering rosettes. Associated species at White Ness and West Burrafirth included *Draba incana*, *Trifolium repens*, *Lotus corniculatus*, *Anthyllis vulneraria*, *Euphrasia confusa*, *Plantago lanceolata*, *P. maritima*, *Scilla verna* and *Festuca vivipara*. Other associated plants, at White Ness only, included *Polygala vulgaris*, *Silene acaulis*, *Cerastium fontanum* subsp. *triviale*, *Linum catharticum*, *Alchemilla vestita* subsp. *filicaulis*, *Primula vulgaris*, *Veronica officinalis*, *Thymus drucei*, *Galium verum*, *Succisa pratensis*, *Bellis perennis*, *Orchis mascula* (very rare), *Cynosurus cristatus* and *Poa subcaerulea* (frequent).

At West Burrafirth only, *Calluna vulgaris* (locally dominant), *Euphrasia foulaensis*, *Solidago virgaurea* (frequent), *Hypochoeris radicata*, *Leontodon autumnalis*, *Dactylorhiza maculata* subsp. *ericetorum*, *Hieracium orimeles* and *H. attenuatifolium*. A note of the associated species was not made at the Ronas Voe station. It is surprising that this taxon has not been detected sooner, at least at White Ness, which is a relatively well-populated area near to Lerwick and the main West Mainland road. The other stations are rather remote, especially the Ronas Voe locality, which is several miles from the nearest road and scarcely accessible except by boat. It is now abundantly evident that this is an indigenous member of the Zetland flora. The writer is indebted to Mr David McClintock for lists of associated species and to Dr C. West for help with this note. —W. SCOTT

633/1. CORALLORHIZA TRIFIDA Chatel. at Roanhead, V. c. 69.

A Plant Note in *Proc. bot. Soc. Br. Isl.*, **6,** 390 (1967) quotes Mr V. S. Summerhayes as stating that peloric forms of this species had as yet been recorded only for Scotland. On 23rd May 1965 Miss V. Gordon, Miss A. Swinney, my wife and myself discovered two adjacent small groups of peloric plants on Roanhead dunes, N. Lancashire. They were growing amongst *Salix repens* and bryophytes, and all had three sepals and three 'labella-like' petals lying almost horizontally. Colour transparency photographs were taken. Miss Gordon sent a letter about this observation together with specimens of a normal plant and of a single peloric flower to the Royal Botanic Garden, Kew, where they were acknowledged for deposition in the herbarium.

—R. E. THOMAS

676/4. POA ALPINA L.—Distribution in Britain.

Notes by P. S. Lloyd, *Proc. bot. Soc. Br. Isl.*, **5,** 232-233, 375 (1964) state that the discovery of semniferous *Poa alpina* in Upper Teesdale in 1962 constitutes the third known locality of the semniferous form of the plant in Britain. This statement is not surprising in view of the widely held belief that the semniferous form was known in only two places in Britain, namely Caenlochan Glen, V. c. 90, and Ingleborough, V. c. 64 (e.g. see Raven and Walters, *Mountain Flowers*, London, 141 (1956)). However the semniferous form had been discovered previously in two new localities, Seana Bhraigh, V. c. 106 in 1956, and Ben More Assynt, V. c. 107 in 1959 by Dr D. A. Ratcliffe, *Trans. Proc. bot. Soc. Edinb.*, **39,** 110, 111, (1960).

This year (1967) Mr R. W. Jones and I found the semniferous form in small quantity growing with fairly plentiful 'viviparous' plants at 3,100 ft in a wet gully in andesite lava on Bidean nam Bian, Glencoe, V. c. 98.

On my return from Scotland I examined the specimens of *Poa alpina* in Herb. Univ. Cantab. (CGE) and found sheets of the semniferous form from three further localities: Beinn a'Bhuird, V. c. 92, 5 August 1831, Dr Graham; Càrn nan Sac, Glen Shee, V. c. 89, August 1886, P. Ewing; Beinn Heasgarnich, V. c. 88, July 1909, P. Ewing. Specimens of the last named gathering were distributed through the Watson Botanical Exchange Club, and were commented on by E. F. Linton, *Rep. Watson bot. Exch. Club*, **2,** 266 (1910).

Thus, to my knowledge, semniferous *Poa alpina* occurs in nine different vice-counties in Britain. In three of these localities (Seana Bhraigh, Ben More Assynt, and Bidean nam Bian) the semniferous form grows with, but in much smaller quantity than, the 'viviparous' form. In the two localities where I have seen the two forms growing together the semniferous form is easily overlooked as (a) at the time of my observations in late July and early August the panicles of the 'viviparous' form were well developed and their stalks extended far beyond the uppermost leaf-sheath, whereas the panicles of the semniferous form were still partly included in the uppermost leaf-sheath; (b) semniferous *Poa alpina* has a rather 'ordinary' appearance compared with the distinctive 'viviparous' form.

On both Seana Bhraigh and Bidean nam Bian I noticed a tendency for the 'viviparous' form to favour ledges on the gully walls, whereas the semniferous form favours grassy patches on scree in the middle of the gullies. It seems probable that closer examination of other British populations of *Poa alpina* would reveal the presence of semniferous plants.—B. A. MILES.

PLANT RECORDS

Compiled by E. C. WALLACE

'Plant Records' are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1966.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora*.

† before the *L.B.V.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings*. Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora*, but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§ 1/2. LYCOPODIELLA INUNDATA (L.) Holub (*Lycopodium inundatum* L.). ‡**H.37,** Armagh; bog, just south of the river Blackwater near to where it empties into the south-west corner of Lough Neagh, 1964, R. E. PARKER (1967, *Ir. Nat. J.*, **15,** 299).

1/4. LYCOPODIUM CLAVATUM L. **16,** W. Kent & **17,** Surrey; Limpsfield Chart, abundant along a woodland ride, chiefly in Surrey but extending into W. Kent, 1966 R. CLARKE & E. J. CLEMENT, comm. D. P. YOUNG, **17,** Surrey; Chelsham, a single plant (but evidently several years old) in gravel workings, 1966, R. CLARKE, comm. D. P. YOUNG.

4/1 × 4. EQUISETUM × TRACHYODON A. Braun. **H.26,** E. Mayo; a single clump was found in a fissure on limestone pavement by Lough Mask near the bridge over to Inishcoog. The only other record from **H.26** is that of Praeger from Lough Carra (94/24) where he collected it in 1906. The only record from **H.16** is a Praeger specimen collected in 1935 at Lough Ballard (84/71), near Roundstone, G. HALLIDAY, G. C. ARGENT & D. L. HAWKSWORTH (1967, *Ir. Nat. J.*, **15,** 323).

22/2. POLYSTICHUM ACULEATUM (L.) Roth. †**29,** Camb.; area wall below grating N. Brink, Wisbech, 1966, R. C. CLARKE. Almost certainly a recent introduction. Previously known only from Gamlingay where it has long been extinct (1967, *Nature Cambs.*, **10,** 34).

† 23/1. CYRTOMIUM FALCATUM (L.f.) C. Presl. ‡**33,** E. Glos.; naturalised in some quantity in the 'areas' of terrace houses, St George's Road, Cheltenham, growing with *Phyllitis scolopendrium*, 1965, E. MILNE-REDHEAD (1966, *Proc. Cotteswold Nat. Fld Club*, **34,** 229).

§ 25/9. Polypodium australe Fée. ‡**50,** Denb.; carboniferous limestone cliffs behind Llanddulas, near Plas Newydd farm, in places abundant and robust on 21st January 1967, W. Elfyn Hughes: near Ruthin on limestone scree, and at Cefn caves on carboniferous limestone ledge, on 26th Feb. 1967, R. H. Roberts: ‡**51,** Flint; near Caerwys on 26th Feb. 1967, R. H. Roberts: Craig Fawr, Meliden, near Prestatyn, very sparingly on a limestone cliff, 1967, W. Elfyn Hughes (1967, *Nature Wales*, **10,** 131). **69,** Westmorland; near Lowood, 1846, J. Sidebotham (Herb. Manchester Museum, MANCH), det. and comm. R. H. Roberts.

65/3. Corydalis claviculata (L.) DC. **37,** Worcs.; wood south-east of Kidderminster, 1962, J. A. Kiernan.

46/22. Ranunculus peltatus Schrank. **43,** Radnor; Gilwern Brook, 1966, Miss A. C. Powell, comm. nat. mus. wales.

75/1. Crambe maritima L. **H.20,** Wicklow; a single plant on Killiney beach, 1966, R. N. Goodwillie, conf. nat. mus. ireland (Dublin); first record since 1868 (1967, *Ir. Nat. J.*, **15,** 307).

† 86/2. Capsella rubella Reut. **13,** W. Sussex; by the Chichester Canal (Chichester railway station end), Mrs J. F. Leslie, det. & comm. G. A. Matthews.

89/1. Subularia aquatica L. **H.16,** W. Galway; near Ballynahind, close by the road to Roundstone, 1966, J. Rogerson.

136/6. Sagina saginoides (L.) Karst. **108,** W. Sutherland; on sea cliffs near Stoer, growing on bare cliff ledges at 30-80 ft. o.d., 1959, J. Anthony (1967, *Trans. Proc. bot. Soc. Edinb.*, **40,** 335).

§†149/3. Montia sibirica (L.) Howell. ‡**H.39,** Belfast; grounds of Stranmillis College, Belfast, 1965, C. M. McMahon (1967, *Ir. Nat. J.*, **15,** 305).

§†170/2. Oxalis corniculata L. ***18,** S. Essex; garden weed, Ilford and Walthamstow, D. H. Kent.

222/1. Sanguisorba officinalis L. **17,** Surrey; meadow beside the Hogsmill river, Ewell, 1966, Mrs. C. Arcus, comm. D. P. Young.

†244/1. Philadelphus coronarius L. ***37,** Worcs.; wood by Henbury Church, 7 km south of Bromsgrove, 1963, J. A. Kiernan.

§ 259/1. Myriophyllum verticillatum L. ***42,** Brecon; Pant y Llyn, 1966, Miss A. C. Powell, det. G. Evans, comm. nat. mus. wales.

259/4. Myriophyllum alterniflorum D.C. **43,** Radnor; Gilwern Brook, 1966, Miss A. C. Powell, det. G. Evans, comm. nat. mus. wales.

§†280/1. Smyrnium olusatrum L. ***32,** Northants.; well established in shrubbery bordering Billing Road, St Andrew's Hospital, Northampton; known here for many years to the late H. G. Allen, R. C. Palmer.

320/2. Polygonum oxyspermum C. A. Meyer & Bunge ex Ledeb. Subsp. raii (Bab.) D. A. Webb & A. O. Chater (*P. raii* Bab.) **H.16,** W. Galway; beach sand at Bunowen Bay, 1966, J. Rogerson.

† 320/21. Polygonum polystachyum Wall. ex Meisn. **52,** Anglesey; Pwll Fanog, Llanfair P.G., 1966, W. Elfyn Hughes.

§ 330/5. Ulmus carpinifolia Gled. ‡**3,** S. Devon; Silverton, several trees in orchard hedge, 1965, G. S. Steele-Perkins, conf. at university of exeter (as *U. nitens* Moench), (1966, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **98,** 83).

330/1. × 5. Ulmus carpinifolia Gled. × U. glabra Huds. **37,** Worcs.; by Gladder Brook near Liveridge Farm, 4 km N.W. of Stourport, 1966, J. A. Kiernan, det. R. Melville.

§ 335/3. Betula nana L. ‡**66,** Durham; blanket bog in Upper Teesdale, a small colony, T. G. Hutchinson (1966, *New. Phytol.*, **65,** 351): erroneously recorded as V.-c. **65,** N.-W. York in *Proc. bot. Soc. Br. Isl.*, **6,** 395 (1967), W. A. Clark. Delete V.-c. **65,** from **C.F.-Ed.**

§ 343/14. Salix nigricans Sm. *†**26,** W. Suffolk; a colony of at least 14 bushes, both ♂ and ♀, in a mixed *Salix* swamp in old gravel pit, Red Lodge Warren, 5 miles N. E. of Newmarket, 1966, E. J. Clement, conf. R. D. Meikle (Hb. Kew, K).

§ 348/1. Phyllodoce caerulea (L.) Bab. ‡**97,** Westerness; Ben Alder, a single plant on acid soil among *Calluna*, *Erica tetralix*, *E. cinerea*, etc., *c.* 2,200 ft, 1966, R. McBeath & C. Jubb (1967, *Trans. Proc. bot. Soc. Edinb.*, **40,** 335).

§ 359/3. Pyrola rotundifolia L. ‡ **4,** N. Devon; Braunton Burrows, 8 plants, 1964, F. R. Elliston Wright (1966, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **98,** 83).

§ 362/1(2). Monotropa hypophega Wallr. ‡**H.21,** Dublin; under hazel on the bank which rises steeply on the east side of the river Dodder in Glenasmore, R. M. McMullen (1967, *Ir. Nat. J.*, **15,** 307).

† 370/5 Lysimachia punctata L. **37,** Worcs.; north side of Ockeridge Wood, 10 km N.W. of Worcester, 1966, J. A. Kiernan.

382/1. Centaurium pulchellum (Sw.) Druce. **37,** Worcs.; disused railway west of bridge at Brotheridge Green, 5 km. E. of the Malvern Hills, 1966; previously believed extinct in the county, J. A. Kiernan.

§ 385/4. Gentianella anglica (Pugsl.) E. F. Warb. ‡**6,** N. Som.; Dundon Hill, Compton Dundon, 1963, Miss C. M. Andrew, det. at kew (1966, *Proc. Somerset archaeol. nat. hist. Soc.*, **110,** 125).

† 392/3. Symphytum orientale L. **37,** Worcs.; well established on roadside between Alfrick and Gews Hill, 12 km. W. of Worcester, J. A. Kiernan. **66,** Durham; perhaps formerly planted, but now widespread on the banks of the Wear and elsewhere in Durham City, 1966, A. Silverside (1967, *Vasculum*, **52,** 16).

† 394/1. Trachystemon orientalis (L.) D. Don. **52,** Anglesey; well naturalized on a roadside near Moel-y-don Ferry, Llanfair, P.G., W. Elfyn Hughes, comm. nat. mus. wales.

§ 416/9. Verbascum blattaria L. *†**32,** Northants.; grass verge, Wilby, two plants. 1966, Miss D. Rollitt, det. C. C. Townsend.

§ 426/1. Limosella aquatica L. ‡**42,** Brecon; Pant y Llyn, 1966, Miss A. C. Powell, comm. nat. mus. wales. For an earlier record see Hyde, H. A. & Wade, A. E., *Welsh Flowering Plants*, 118 (1934). **-Ed.**

433/1. Rhinanthus serotinus (Schönh.) Oborny. **17,** Surrey; abundant amongst grass and scrub on a chalk hillside, Coulsdon, 1966, B. Wurzell, conf. D. J. Hambler & D. P. Young.

† 438/C. Calceolaria chelidonioides Humboldt, Bonpland & Kunth. **35,** Monmouth; garden weed, Tredegar, 1966, C. Bate, det. S. G. Harrison, comm. nat. mus. wales.

442/4. Utricularia minor L. **42,** Brecon. Pant y Llyn, 1966, Miss A. C. Powell. comm. nat. mus. wales.

† 492/1. Leycesteria formosa Wall. **H.19,** Kildare; regenerating from seed and apparently spreading along hedgerows and ditch-banks of the Lyon's Estate, Celbridge, P. L. Curran (1967, *Ir. Nat. J.*, **15,** 305).

479/1. Jasione montana L. **32,** Northants; disused railway platform, Braunston, a single plant, 1965; not recorded in the county during the present century, Mrs H. Nobles, det. & comm. Mrs G. M. Gent.

§†503/1. Galinsoga parviflora Cav. ***32,** Northants; garden weed, Wothorpe, a single plant, 1965, J. H. Chandler, conf. J. L. Gilbert.

† 519/9. Aster salignus Willd. **49,** Caern.; borders of Llyn Peris, near Llanberis, 1966, W. Elfyn Hughes, comm. nat. mus. wales.

§†535/2. Artemisia verlotorum Lamotte. ***19,** N. Essex; one clump on roadside verge near crossroads, Alresford, R. M. Harley.

† 544/10. Centaurea solstitialis L. **32,** Northants; car park, Northampton, a single plant, 1965, T. Barratt, det. & comm. Mrs G. M. Gent.

† 557/3. Cicerbita macrophylla (Willd.) Wallr. **66,** Durham; a few plants in Castle Eden Dene, G. G. & P. S. Graham (1967, *Vasculum*, **52,** 8).

558/1 (96). Hieracium pellucidum Laest. **52,** Anglesey; railway embankment near Cefn reservoir, Llangefni, 1966, W. Elfyn Hughes, det. A. E. Wade, comm. nat. mus. wales.

558/1 (154). Hieracium maculatum Sm. ***37,** Worcs.; railway, Twyland Wood, 3 km S. of Halesowen, 1963, J. A. Kiernan, det. C. E. Andrews.

577/19 × 11. Potamogeton × lintonii Fryer. **37,** Worcs.,; Dudley Canal, E. of Halesowen, 1963, J. A. Kiernan, det. J. E. Dandy. The parent *P. friesii* has not yet been recorded from V.C. **37,** J. A. Kiernan.

§590/1. Maianthemum bifolium (L) Schmidt. ***61,** S.-E. York; Great Givendale, near Pocklington, *c.* 30 plants, C. Bucke.

§†605/2. Juncus tenuis Willd. **H.16,** W. Galway; path by Kylemore Chapel, 1966, G. Halliday, G. C. Argent & D. L. Hawksworth: track between ford and road by Kylemore River, east of Benbaum, 1966, D. P. Spicer: lane near Teernakill Bridge, Maam, 1965: Carrowgarriff, South-east of Maam, 1966, D. A. Webb: lane by Hill of Doon, 1965: rough grassland 1 mile west of Cornamona, 1965: roadside on south side of Ferry Bridge, 1965, G. Halliday, G. C. Argent & D. L. Hawksworth: roadside in centre of Doorus peninsula, 1965, (Herb. Trinity Coll., Dublin, TCD) (1967, *Ir. Nat. J.*, **15,** 313-314): locally abundant on roadside verges at Ballynahinch, 1966: ***H.27,** W. Mayo; by the road linking Lough Mask and Lough Nafoocy, near the top of the saddle on the west side, J. H. Rogerson.

§ 606/2. Luzula Forsteri (Sm.) DC. ***43,** Radnor; woodland by disused railway adjacent to the river Wye, Boughrood, R. M. Harley & A. B. Emden.

601/1. Muscari atlanticum Boiss. & Reut. †**17,** Surrey; a well-established patch on a very wild chalk hillside west of Reigate, 1965-66, C. W. Ward, conf. & comm. D. P. Young.

§ 625/6. Epipactis phyllanthes G. E. Sm. ***7,** N. Wilts.; Savernake, roadside under beeches and oaks, on clay with flints, 1964, Mrs A. Sheppard, det. & comm. D. P. Young. **17,** Surrey; Churt, shady roadside bank, on Lower Greensand (pH7), 1964, surrey flora committee field meeting, comm. D. P. Young; Tilford, in a similar situation, 1965, The Hon. L. Ponsonby, conf. & comm. D. P. Young. The record from Weybridge (*Proc. bot. Soc. Br. Isl.*, **5,** 355 (1964)) should have been attributed to L. W. Low, **21,** Middx.; Harefield, a second station in a copse on gravel soil, 1966, S. E. Crooks, conf. & comm. D. P. Young. **24,** Bucks.; Fingest, 1965, Mrs J. A. Cole, det. & comm. D. P. Young.

631/1. Hammarbya paludosa (L.) Kuntze. **3,** S. Devon; northern Dartmoor, details of locality withheld; only reported from Devon once during the present century, 1965, P. Hawkins (1966, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **98,** 83).

§ 639/1. Neotinea intacta (Link.) Reichb. f. ***71,** Isle of Man; see paper on p. 165.

§ 642/1. ORCHIS PURPUREA Huds. ***36,** Hereford; under hazel in hazel coppice at edge of beech wood on calcareous subsoil, near Wormbridge, Lady EMMA TENNAT; seen *in situ* by Mrs L. E. WHITEHEAD (Recorder for V.C. **36**), comm. G. A. MATTHEWS.

655/9. SCIRPUS TABERNAEMONTANI C.C. Gmel. **H.16,** W. Galway; westward edge of Lough Anillaun, Cleggan, 1966, J. ROGERSON.

§ 656/6. ELEOCHARIS UNIGLUMIS (Link) Schult. ‡**3,** S. Devon; Aveton Gifford, 1960, C. A. SINKER: Dawlish Warren, 1963, J. J. HAYWARD (1966, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **98,** 83).

§ 663/4. CAREX HOSTIANA DC. ‡**H.22,** Meath; frequent over several acres with *C. dioica*, at the south-west corner of Commons, Duleek, 1966, D. SYNNOTT (1966, *Ir. Nat. J.*, **15,** 323).

§ 663/76. CAREX RUPESTRIS All. ‡**96,** Easterness; on calcareous schist in Cöire Ghoirbhlach, Glenfeshie Forest, 1966, J. GRANT ROGER (1967, *Trans. Proc. bot. Soc. Edinb.*, **40,** 337).

§ 663/81. CAREX DIOICA L. ‡**H.22,** Meath; Commons, Duleek, 1966, J. P. BRUNKER (1967, *Ir. Nat. J.*, **15,** 323).

672/5. VULPIA AMBIGUA (Le Gall) More. **3,** S. Devon; Staverlen, railway siding, 1965, V. M. WILKINSON, conf. at BRIT. MUS. (NAT. HIST.); first inland record for Devon (1966, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **98,** 84).

§ 686/1. ELYMUS ARENARIUS L. ‡**H.22,** Meath; sandy foreshore near the river-mouth at Mornington, 1966: ‡**H.31,** Louth; by the sea about half a mile north of the mouth of Boyne at Baltray, 1966, D. SYNNOTT (1967, *Ir. Nat. J.*, **15,** 323).

§ 700/4. CALAMAGROSTIS SCOTICA (Druce) Druce. ‡**80,** Roxburgh; abundant in a wet depression by the side of a stream, parish of Roberton, 1965, R. W. M. CORNER, conf. A. MELDERIS (1967, *Trans. Proc. bot. Soc. Edinb.*, **40,** 336).

§†718/1. ECHINOCHLOA CRUS-GALLI (*L.*) Beauv. ‡**H.20,** Wicklow; a single specimen as a weed in a row of carrots, Ballygraine House, Arklow, 1966, N. CHUTER, det. M. J. P. SCANNELL (1967, *Ir. Nat. J.*, **15,** 305).

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

I am indebted to Dr R. K. Brummitt for drawing my attention to many obscure references. Thanks are also due to D. E. Allen and E. B. Bangerter for their assistance.

SYNOPSIS

Page
Systematic, etc. 201
Topographical 260
Floras 264
Ecological (See also Topographical) 267
Phytogeographical and Phytosociological 269
Chromosome Surveys 275
Historical 276
Biographical 278
Obituaries 280
Palaeobotany 281
Herbarium, Laboratory, Recording techniques, etc. 283
Classification, Nomenclature and Botanical Terminology 283
Miscellaneous 286

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1/2. LYCOPODIELLA INUNDATA (L.) Holub (*Lycopodium inundatum* L.). Parker, R. E., 1967, Lycopodium inundatum in north-east Ireland, *Ir. Nat. J.*, **15,** 299-300. The discovery of *Lycopodiella inundata* near Lough Neagh, Co. Armagh, is reported, and the Irish records and the general distribution of the species in the country are reviewed.—[D.H.K.]

1/4. LYCOPODIUM CLAVATUM L. Bonnet, A. L. M., 1966, Sur le mode de ramification et la croissance de Lycopodium clavatum L., *Naturalia monspel., Sér. bot.*, **17,** 31-80. Studies on the branching of *Lycopodium clavatum* and the factors controlling it.—[D.H.K.]

2. SELAGINELLA. Cour, P., 1966, Le genre Selaginella en France, *Bull. Cent. Étud. Rech-Scient., Biarritz*, **6,** 11-56. This account of *Selaginella* in France is in three parts: first the history and description of the family Selaginellaceae are given; the second deals with the genus, and keys are provided for the four species *Selaginella selaginoides*, *S. kraussiana*, *S. denticulata* (L.) Spring and *S. helvetica* (L.) Spring; the third deals with each species morphologically and gives details of their biology and distribution. Illustrations are provided by P. Bosserdet.—[E.B.B.]

2. Selaginella. Jermy, A. C., Jones, K. & Golden, C., 1967, Cytomorphological variation in Selaginella, *J. Linn. Soc. Bot.*, **60**, 147-158.

4. Equisetum. Borg, P., 1967, Studies on Equisetum hybrids in Fennoscandia, *Annls. Bot. Fenn.*, **4**, 35-50. Studies in the field and examination of herbarium material collected in Fennoscandia has revealed the presence of two hybrids in *Equisetum*, viz. *E.* × *litorale* (*E. arvense* × *fluviatile*) and *E.* × *trachyodon* (*E. hyemale* × *variegatum*).

E. × *litorale* was found to be very variable, sometimes resembling *E. arvense* and sometimes *E. fluviatile*. Field observations and cultivation experiments have shown, however, that this variation is not of genetic origin but is caused by environmental factors. The most reliable characters for identifying this hybrid were found to be the length of the first internode of the branch, the shape of the upper part of the stem and cross-sections of the aerial and subterranean stems as well as the position of the endodermis. *E.* × *litorale* grows in a variety of habitats including peaty spruce swamps, lake verges, river banks, sea shores, road verges and railway sides. A map shows its known distribution, but it is probably more common than this suggests as the hybrid is not well understood.

E. × *trachyodon* shows very little variation, though it can be confused with large specimens of *E. variegatum*. From these it can be separated by its very thick stem, relatively long sheath and its long narrow teeth, which have a narrow membranaceous margin. Its habitats include sandy open sites, where there is little competition from other species, chiefly on the shores of lakes and banks of rivers. Its rhizomes have been found up to a depth of *c.* 10 cm, and their pattern closely resembles that of *E. variegatum*. A map illustrates its distribution in Fennoscandia. Other hybrids described in the literature were not encountered during the study, but it is possible that the following may occur:— *E. arvense* × *pratense*, *E. arvense* × *palustre* and *E. pratense* × *sylvaticum*.—[D.H.K.]

4. Equisetum. Hauke, R. L., 1966, About horsetails and mare's nests: a case study in plant taxonomy, *Ward's Bull*, **5**, 1-6. A study of numerous specimens of *Equisetum arvense* and hybrids between it and various other species of *Equisetum* have led to the conclusion that there is no evidence that there are valid sub-groups of the species showing distinctive geographical distributions.—[D.H.K.]

4/9. Equisetum arvense L. Hauke, R. L., 1967, Sexuality in a wild population of Equisetum arvense gametophytes, *Am. Fern J.*, **57**, 59-66.

4/9. Equisetum arvense L. Hauke, R. L., 1967, A systematic study of Equisetum arvense, *Nova Hedwigia*, **13**, 69-109. *Equisetum arvense* is noteworthy for the many variable growth forms that it can assume. This detailed survey shows that these are merely superficial modifications and that none of them are worthy of taxonomic recognition. The author points out that the most reliable features which distinguish the species are—rhizomes, including internodes felted, branches 3-4 angled, with the first branch internode exceeding the subjacent sheath, stems with usually 6-12 dark, narrow acute teeth, stem sheaths slightly longer than wide, slightly involute or appressed to stem, and branch teeth with subulate tips. The internal anatomical pattern of *E. arvense* is also very important as a diagnostic character as it differs from all other species of the genus—[D.H.K.]

5.→ Pteropsida. Devi, S., 1966, Spore morphology of the Pteridaceae, 1. The pteridoid ferns, *Grana Palynol.*, **6**, 476-497.

5.→ Pteropsida. Dhien, R., 1966, Monographie des Fougères d'Europe, *Revue Féd. Franc. Soc. Sci. Nat.*, **5**, 125-132.

5.→ Pteropsida. Klekowski, E. J., Jr., 1967, Observations on Pteridophyte life cycles: relative lengths under cultural conditions, *Am. Fern J.*, **57**, 49-51.

5.→ Pteridophyta. Kunkel, G., 1965 (1966), Enumeración de los Helechos de Lunzarote, *Revta. Mus. Canar.*, **26**, (93-96), 7-17. An enumeration of the ferns of the Canary Islands, with descriptions, synonymy and details of distributions. Species which also occur in the British Isles are *Asplenium onopteris*, *Adiantum capillus-veneris*, *Anagramma leptophylla*, *Pteridium aquilinum* and *Polypodium australe*.—[D.H.K.]

5.→ PTEROPSIDA. Kunkel, G., 1966, Zur Pteridophytenflora der Insel Gran Canaria, *Ber. Schweiz. bot. Ges.*, **76,** 42-58. A detailed study of the ferns of the Canary Islands, which includes many species also found in Britain. A new combination *Polypodium australe* Fée var. *cambricum* (L.) Kunkel, comb. nov., non rite public. is included.—[D.H.K.]

5.→ PTEROPSIDA. Pichi-Sermolli, R. E. G., *et al.*, 1965, Index Filicum Supplementum Quartum pro Annis 1934-1960, *Regnum Veg.*, **37.** Pp. xiv + 370. A fourth supplement to C. Christensen's *Index Filicum* (1905-6).—[D.H.K.]

5. OSMUNDA. Miller, C. N., Jr., 1967, Evolution of the Fern genus Osmunda, *Contr. Mus. Paleont. Univ. Mich.*, **21,** 139-203.

5. OSMUNDA. Tatuno, S. & Yoshida, H., 1966, Karyologische Untersuchungen über Osmundaceae, 1. Chromosomen der Gattung Osmunda aus Japan, *Bot. Mag., Tokyo*, **79,** 244-252.

5/1. OSMUNDA REGALIS L. Schulze, G., 1965, Die Verbreitung des Königsfarns (Osmunda regalis L.) in der Pfalz, *Mitt. Pollichia pfälz. Ver. Naturk. NatSchutz, ser.* 3, **12,** 292-303.

7/1. HYMENOPHYLLUM TUNBRIGENSE (L.) Sm. Benl, G., 1967, Hymenophyllum tunbrigense (L.) Sm. in Anaga-Gebirge (Tenerife), *Cuad. Bot.*, **1,** 25-27. A new locality for *Hymenophyllum tunbrigense* is reported for the Canary Islands.—[D.H.K.]

8. PTERIDIUM. Whittier, D. P., 1966, Induced apogamy in diploid gametophytes of Pteridium, *Can. J. Bot.*, **44,** 1717-1721.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Maini, J. S. & Horton, K. W., 1966, Reproductive response of Populus and associated Pteridium to cutting, burning and scarification, *Can. Dept. For. Rural Dev. For. Br. Dept. Publ.*, **1155.** Pp. 20. Studies on the regeneration response of two Canadian species of *Aspen* and *Pteridium aquilinum* to cutting, scarification and burning and removal of ground vegetation under field experimental conditions in southern Ontario.—[D.H.K.]

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Ruffier-Lanche, R., 1965, Pteridium aquilinum calcifuge ou calcicole?, *Bull. mens. Soc. Linn. Lyon*, **34,** 359-360.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Sobota, A. & Partanen, C. R., 1967, The growth and division of cells in relation to morphogenesis in fern gametophytes, 2. The effect of biochemical agents on the growth and development of Pteridium aquilinum, *Can. J. Bot.*, **45,** 595-603.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Watt, A. S., 1967, The differentiation and fate of the bracken (Pteridium aquilinum) frond and their relation to the age-structure of the shoot and frond population, *New Phytol.*, **66,** 75-84.

11/1. ADIANTUM CAPILLUS-VENERIS L. Eberle, G., 1964, Venushaar-Farn, *Natur und Museum*, **94,** 33-36. A short account of *Adiantum capillus-veneris* in Germany —[D.H.K.]

13/1. BLECHNUM SPICANT (L.) Roth. Löve, A. & Löve, D., 1966, The variation of Blechnum spicant, *Bot. tidsskr.*, **62,** 186-196. The only boreal species of the genus *Blechnum*, i.e. *B. spicant* (L.) Roth, is represented by the main subspecies *spicant* in Europe and the subspecies *nipponicum* (Kunze) Löve & Löve, stat. nov., in Pacific North America and Asia. The European subspecies includes theheterophyllous var. *spicant* and the two homophyllous varieties *fallax* Lange, which is endemic on a hot spring cone in Iceland, and var. *homophyllum* (Merino) Löve & Löve, comb.

nov., of north-western Spain and northern Portugal. All these races are characterized by the chromosome number $2n = 68$.—[Authors' summary]

13/1. BLECHNUM SPICANT (L.) Roth. Lugardon, B., 1966, Formation de l'exospore chez Blechnum spicant (L.) Roth, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262,** 2029-2031.

13/1. BLECHNUM SPICANT (L.) Roth. Lugardon, B., 1966, Structure des parois de la spore de Blechnum spicant (L.) Roth, *Pollen et Spores*, **7,** 409-428.

15. ASPLENIUM. Lebrun, J.-P., 1966, Le genre Asplenium en Seine-et-Marne: quelques repartitions à prèciser, *Bull. Ass. Nat. Loing*, **42,** 118-119. Notes on the distribution of 11 species of *Asplenium* in the Department of Seine-et-Marne.—[E.B.B.]

15. ASPLENIUM. Lebrun, J.-P., 1966, Les pteridophytes dans la région parisienne. Le genre Asplenium, *Cah. Nat.*, **22,** 13-23. Notes on the species of *Asplenium* found in the region of Paris.—[D.H.K.]

15. ASPLENIUM. Meyer, D. E., 1967, Über neue und seltene Asplenien Europas, 4. Mitteilung, *Ber. dt. bot. Ges.*, **80,** 28-39.

15/3. ASPLENIUM FONTANUM (L.) Bernh. Lawalrée, A., 1966, Asplenium fontanum (L.) Bernh. (Aspleniaceae) indigène en Belgique?, *Bull. Jard. bot. État Brux.*, **36,** 393-395. The history and status of *Asplenium fontanum* in Belgium is reviewed.—[D.H.K.]

15/8. ASPLENIUM SEPTENTRIONALE (L.) Hoffm. Swies, F., 1966, Rozmieszczenie Asplenium septentrionale (L.) Hoffm. i Aconitum moldavicum Hacq. w poludniowej Polsce, *Fragm. Flor. geobot.*, **12,** 135-140. The distributions of *Asplenium septentrionale* and *Aconitum moldavicum* in Poland are reviewed and discussed.—[D.H.K.]

15/8 × 5. ASPLENIUM × ALTERNIFOLIUM Wulf. Bouharmont, J., 1966, Note sur Asplenium × alternifolium Wulfen, *Bull. Jard. bot. État Brux.*, **36,** 383-391. Notes on the cytology, morphology, distribution and variability of *Asplenium × alternifolium*.—[D.H.K.]

21. DRYOPTERIS. Agostini, R., 1966, Riaccertamento di Dryopteris dilatata (Hoffm.) A. Gray in Calabria, *Archo. bot. Biogeogr. Ital.*, **41,** 213-222.

21. DRYOPTERIS. Britton, D. M., 1967, Diploid Dryopteris dilatata from Québec, *Rhodora*, **69,** 1-4. Diploid *Dryopteris dilatata* long known from the Lake Superior area of Canada has now been discovered in Québec. The plant has a chromosome number of $n = 41$ and is probably conspecific with *D. assimilis* S. Walker.—[D.H.K.]

21. DRYOPTERIS. Deschartres, R., 1966, Dryopteris borreri et Dryopteris tavelii Rothm. en Montagne bourbonnaise, *Revue scient. Bourbonn. Cent. Fr.*, **1965,** 26-32.

21. DRYOPTERIS. Hirabayashi, H., 1967, Chromosome numbers in Japanese species of Dryopteris (2), *J. Jap. Bot.*, **42,** 44-48.

21. DRYOPTERIS. Loyal, D. S., 1966, Apomixis in ferns with particular reference to Dryopteris Adanson and some heterosporous members, *J. Indian bot. Soc.*, **45,** 44-53.

21. DRYOPTERIS. Widén, C.-J. & Sorsa, V., 1966, A chromatographic and cytological study of the Dryopteris spinulosa complex in Finland, *Hereditas*, **56,** 377-381. *Dryopteris assimilis* S. Walker is distributed widely throughout Finland while *D. dilatata* is very rare and is known only from south-west coastal districts and probably the Åland Islands. *D. spinulosa*, *D. cristata* and the hybrid, *D. dilatata × spinulosa*, also occur in the country.—[D.H.K.]

21. DRYOPTERIS. Wieffering, J. H., Fikenscher, L. H. & Hegnauer, R., 1965, Chemotaxonomische Untersuchungen mit Dryopteris-Arten, 6. Dryopteris spinulosa-Komplex, *Pharm. Weekbl. Ned.*, **25,** 737-754.

21/a. Dryopteris assimilis S. Walker. Gätzi, W., 1966, Zur Kenntnis von Dryopteris assimilis S. Walker, *Ber. schweiz. bot. Ges.*, **76,** 145-156. Reports the occurrence of *Dryopteris assimilis* in Switzerland and reviews the taxonomy, morphology and cytology of the species and of *D. dilatata.* The hybrid between *D. assimilis* and *D. dilatata* is also recorded from the country.—[D.H.K.]

21/a. Dryopteris assimilis S. Walker. Löve, A. & Löve, D., 1966, Islenzki dilaburkninn, *Flóra* (*Iceland*), **4,** 5-9. Recent Icelandic floras and also *Flora Europaea* report the species *Dryopteris dilatata* as occurring in western and northern Iceland. Detailed morphological and cytological studies on Icelandic material have shown, however, that the only fern of the *D. dilatata* complex occurring in Iceland is the recently described species *D. assimilis* S. Walker. It is a diploid plant with $2n = 82$ chromosomes, as previously demonstrated by Walker and others from Europe, and Wagner and others from North America. That number has been confirmed by the present writers on Icelandic material from south-western and northern parts of the country. *D. assimilis* is apparently a circumpolar species, though it still has not been separated from *D. dilatata* in many parts of its area, notably in North America north of the Great Lakes and west to Alaska and in Siberia.—[Author's summary]

21/9. Dryopteris assimilis S. Walker. Simon, T. & Vida, G., 1966, Neue Angaben zur Verbreitung der Dryopteris assimilis S. Walker in Europe, *Annls. Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8,** 275-284. Recent finds of *Dryopteris assimilis* in Europe are reviewed.—[D.H.K.]

21/6. Dryopteris carthusiana (Villars) H. P. Fuchs. Tryon, R. & Britton, D. M., 1966, A study of variation in the cytotypes of Dryopteris spinulosa, *Rhodora*, **68,** 59-92.

22/1. Polystichum setiferum (Forsk.) Woynar. Silverside, A., 1967, Polystichum setiferum (Forsk.) Woynar in Durham City, *Vasculum*, **52,** 5.

23. Cyrtomium. Hsing, K. H., 1965, A taxonomical study of the genus Cyrtomium Presl, *Acta Phytotax. sin. Add.*, **1,** 1-48.

24. Thelypteris. Morton, C. V., 1966, Some new combinations in Thelypteris, *Am. Fern J.*, **56,** 177-179. A number of American species of *Dryopteris* are transferred to *Thelypteris.*—[D.H.K.]

24. Carpogymnia (thelypteris p.p.). Sorso, V., 1966, A diploid Gymnocarpium dryopteris (L.) Newman in Alaska, *Nature*, **210,** 1375. A hybrid between *Carpogymnia dryopteris* (*Thelypteris dryopteris*) and *C. robertiana* (*T. robertianum*) is reported from Alaska. Similar hybrids are known from Sweden, Finland and Russian Karelia, though the latter have not been investigated cytologically.—[D.H.K.]

25. Polypodium. Beckers, B., 1966, Bijdrage tot de biosystematiek van Polypodium L. in België en het groothertogdom Luxemburg, *Bull. Jard. bot. État. Brux.*, **36,** 353-382. A revision of *Polypodium* in Belgium and Luxemburg. *P. vulgare* and *P. interjectum* are the only two species so far noted in the two countries, and details are given of their biology, ecology and variation. Distribution maps of the two species are provided.—[D.H.K.]

28.→ Ophioglossaceae. Hagenah, D. J., 1966, Notes on Michigan Pteridophytes, 2. Distribution of the Ophioglossaceae, *Am. Fern J.*, **56,** 150-163. Notes on the distribution of species of *Ophioglossum* and *Botrychium* in Michigan.—[D.H.K.]

28/1. Botrychium lunaria (L.) Sw. Babai, A., 1966, Conölógiai es talajokológiai vizsgálatok a Botrychium lunaria (L.) Sw. kis-szénási lelchelyén, *Acta biol. Debrec.*, **4,** 3-15.

29. Ophioglossum. Löve, A. & Kapoor, B. M., 1966, An alloploid Ophioglossum, *Nucleus*, **9,** 132-138. The genus *Ophioglossum*, which includes the plant taxon with

the highest chromosome number known, is represented in Europe by three species. It is suggested that the Atlantic and very restricted species *O. azoricum* C. Presl which has the 48-ploid chromosome number $2n = 720$ is a late Tertiary alloploid derivative of the 32-ploid *O. vulgatum* and the 16-ploid *O. lusitanicum*.—[Author's summary]

29. Ophioglossum. Löve, A. & Kapoor, B. M., 1967, The highest plant chromosome number in Europe, *Svensk. bot. Tidskr.*, **67**, 29-32. The highest number reported is that of the southern Asiatic species *Ophioglossum reticulatum* L. which has $2n = 1260$. *O. lusitanicum* L., a small plant of the Mediterranean region and parts of Atlantic Europe to southern Britain has $2n = 240$. *O. vulgatum* L., a widespread boreal-temperate circumpolar species has $2n = 480$. Material of *O. azoricum* C. Presl from Iceland has been found to have $2n = 720$. This plant is often mistaken for small specimens of *O. vulgatum*, and has been treated as a subspecies of that taxon (subsp. *ambiguum* (Coss. & Germ.) E. F. Warb.). It is known to occur in scattered localities in western Europe, including the British Isles, south to the Azores, and may perhaps occur also in the mountains of Poland and Czechoslovakia.—[D.H.K.]

29/P. Pteris. Shieh, W.-C., 1966, A synopsis of the fern genus Pteris in Japan, Ryuku and Taiwan, *Bot. Mag., Tokyo*, **79**, 283-292.

30.→ Gymnospermae. Dallimore, W. & Jackson, A. B., 1966, *A Handbook of Coniferae*. Edition 4, revised by S. G. Harrison. Pp. xix + 729. London. 1966.

30.→ Gymnospermae. Datta, S. C., 1966, *An Introduction to Gymnosperms*. Pp vi + 168. Asia Publishing House. London.

30.→ Gymnospermae. den Ouden, P. & Boom, B. K., 1965, *Manual of Cultivated Conifers Hardy in the Cold- and Warm-Temperate Zone*. Pp x + 526. The Hague.

30. Pseudotsuga. Gaussen, H., 1966, *Les Gymnosperms actuelles et fossiles*, 8. *Genres Pseudolarix, Keteleeria, Larix, Pseudotsuga, Pitiytes, Picea, Cathaya, Tsuga, Trav. Lab. For. Toulouse*, tome 2, sect. 1, vol. 1, part 2, fasc. 8, 481-672.

30/T. Tsuga.—See 30. Pseudotsuga.

31. Picea. Chylarecki, H., 1966, Wyniki introdukeji świerków obcego pochodzenia w Polsce, *Arboretum kórn. Roczn.*, **11**, 152-202. Notes on the introduction and growth of exotic species of *Picea* in Poland.—[D.H.K.]

31. Picea.—See 30. Pseudotsuga.

31/1. Picea abies (L.) Karst. Staszkiewicz, J., 1966, Wstepne badania nad zmiennóscia szyszek swierka postpolitego Picea abies (L.) Karst. subsp. abies z Polski, *Fragm. Fl. Geobot.*, **12**, 349-371. Biometrical studies on the variation in cones of *Picea abies* in Poland.—[D.H.K.]

32. Larix. Kalinin, V. I., 1965, *Listvennica Evropejskogo Severa*. Pp 90. Izdatel'stvo 'Losnaja Promyšlennast', Moskva. Studies on *Larix* in north European Russia.—[D.H.K.]

32. Larix. Wachter, H., 1965, Über die Einführung von Lärchen aus Nordamerika nach Europa im 18 Jahrhundert, *Silvae Genet.*, **12**, 58-64.

32. Larix.—See 30. Pseudotsuga.

33. Pinus. Critchfield, W. B. & Little, E. L., Jr., 1965, Geographic distribution of the pines of the world, *U.S. Dept. Agric. Forestry Serv. Misc. Publ.*, **991.** Pp v + 97 + 61 maps.

33. Pinus. de Ferré, Y., 1965, Structure des plantules et systématique du genre Pinus, *Trav. Lab. For. Toulouse*, tome 2, sect. 1, vol **3**, art. 2, 1-50.

33. Pinus. Edlin, H. L., 1967, A modern sylva, or a discourse of forest trees, 20. Pines from overseas: Pinus genus, *Q. Jl. For.*, **61**, 32-41. Notes on *Pinus* species introduced into Britain.—[D.H.K.]

33. PINUS. Mirov, N. T., 1967, *The Genus Pinus*. Pp viii + 602. The Ronald Press Company. New York. Price $18. A comprehensive survey of the genus *Pinus* covering its history, palaeobotany, geography, genetics, morphology, physiology, ecology, taxonomy and chemo-taxonomy.—[D.H.K.]

33/1. PINUS SYLVESTRIS L. Alexe, A. N., 1964, *Pinul silvestru* [Pinus sylvestris]. Pp. 326. Bucharest. A monograph on *Pinus sylvestris*, covering morphology, taxonomy, ecology, etc.—[D.H.K.]

33/1. PINUS SYLVESTRIS L. Damian, I., Negrutiu, F. & Beldeanu, E., 1965, The biological process of flowering in Pinus sylvestris, *Lucr. Stiint. Inst. Politch. Brasov.* (*Fac. Silv.*) **7,** 269-282.

33/1. PINUS SYLVESTRIS L. Hadders, G., 1967, *Arftlig variation i plantutverkling hos tall* (*Pinus sylvestris L.*). Pp. 118. Akademisk Makinskrift. Uppsala. Studies in genetic variation in seedling development of *Pinus sylvestris*.—[D.H.K.]

33/1. PINUS SYLVESTRIS L. Popnikola, N., 1965, Occurrence of bisexual inflorescences on Scots Pine, *Sum. List.*, **89,** 413-417.

33/1. PINUS SYLVESTRIS L. Pravdin, L. F., 1964, *Sosna obynovennaja; Izmenčivost, vnutrividovaja Sistematika i Selekeija*. Pp. 191. Mockba. Studies on the systematics, variation and breeding selection in *Pinus sylvestris*.—[D.H.K.]

33/1. PINUS SYLVESTRIS L. Przybylski, T., 1966, Local races of Scots Pine (Pinus sylvestris L.) in Poland, their genetic value and origin, *Sum. List.*, **90,** 96-104.

33/1. PINUS SYLVESTRIS L. Smirnov, V. V. & Kuzmina, E. A., 1966, Sezonnye i menenija v khvoe eli (Picea excelsa Link) i sosny (Pinus silvestris L.), *Bjull. Mosk. Obšč. Isp. Prir.* (*Biol.*), **71,** 83-93. Observations on seasonal changes in the 'needles' of *Picea excelsa* and *Pinus sylvestris*.—[D.H.K.]

33/1. PINUS SYLVESTRIS L. Zelawski, W. & Godwin, T., 1966, Variability of some needle characteristics in Scots Pine (Pinus silvestris L.) ecotypes grown on the comparative plantation, *Ekol. pol.*, **14,** 275-283.

33/1. PINUS SYLVESTRIS L. Zelawski, W. & Niwinski, Z., 1966, Variability of some needle characteristics in Scots Pine (Pinus silvestris L.) ecotypes grown in native conditions, *Ekol. pol.*, **14,** 301-308.

34/1. JUNIPERUS COMMUNIS L. Chesney, L., 1966, Sur le développement des cônes femelles du Juniperus communis L. dans la région parisienne, de la pollinisation à la grain, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262,** 2018-2021.

34/1. JUNIPERUS COMMUNIS L. Lemoine-Sébastian, C., 1966, Une nouvelle interpretation du cône femelle des Juniperus, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262,** 107-110.

34/1. JUNIPERUS COMMUNIS L. Lemoine, C., 1966, Les bois des Juniperus. Essai d'anatomie écologique de quelques espèces, *Botanica Rhédonica, ser. A.*, **2,** 37-86.

36.→ RANUNCULACEAE. Jensen, U., 1966, Die Verwandtschaftsverhältnisse innerhalb der Ranunculaceae aus serologischer Sicht, *Ber. dt. bot. Ges.*, **79,** 407-412.

36.→ RANUNCULACEAE. Knowles, E., 1967, Cultivars of British wild plants, 10. Buttercup family, *Gdnrs' Chron.*, **161** (23), 22. Species of the Ranunculaceae in cultivation include *Caltha palustris*, *Trollius europaeus*, *Helleborus foetidus*, *H. viridis*, *Aconitum napellus*, *Anemone nemorosa*, *Pulsatilla vulgaris*, double-flowered forms of *Ranunculus acris*, *R. repens*, *R. bulbosus* and *R. ficaria*, *Aquilegia vulgaris*, *Thalictrum alpinum* and *T. minus*.—[D.H.K.]

36/1. CALTHA PALUSTRIS L. Fornaciari, G., 1966, Una nuova forma di Caltha palustris L. in Friuli, *G. bot. ital.*, **72,** 636-637. A form of *Caltha palustris* with sulphur-coloured flowers from Friuli, Italy, is described as *C. palustris* f. *sulphurea*, forma nov.—[D.H.K.]

41. Consolida. Munz, P. A., 1967, A synopsis of the African species of Delphinium and Consolida, *J. Arnold Arb.*, **48,** 30-55.

41. Consolida. Munz, P. A., 1967, A synopsis of the Asian species of Consolida (Ranunculaceae), *J. Arnold Arbor.*, **48,** 159-202. Descriptions and keys to the identification of the species of *Consolida* found in Asia.—[D.H.K.]

41/D. Delphinium.—See 41. Consolida.

42/1. Actaea spicata L. Garnett, P. M. & Sledge, W. A., 1967, The distribution of Actaea spicata, *Naturalist* (*Yorkshire*), **1967,** 73-76. A review of the present distribution of *Actaea spicata* in Yorkshire in relation to its distribution as shown in the *Atlas of the British Flora*. In the latter one black and three of the 14 white squares were based on inaccurate allocation of inadequately localised records to wrong squares, also six additional squares in which *A. spicata* exists were omitted, while in four squares marked as lacking post 1930 records the species was known to still be present. In nine squares *A. spicata* is confined to single stations, and in two of these to single plants. The total number of distinct stations in Yorkshire is probably not less than sixty. The records for the county are analysed and commented upon under the various 'tetrads' in which the species has been reported.—[D.H.K.]

43. Anemone. Madahar, C., 1967, Mediterranean and Asian taxa of Anemone (Section Eriocephalus) with tuberous rootstocks, *Can. J. Bot.*, **45,** 725-735.

43/1. Anemone nemorosa L. Hadfield, M., 1966, The Wood Anemone: some random notes, *Q. Bull. alp. Gdn. Soc.*, **34,** 142-146.

44/1. Pulsatilla vulgaris Mill. Carter, H. H., 1967, Juniper Valley: some observations and problems, *Reading Nat.*, **19,** 21-29. Includes notes on damage to two colonies of *Pulsatilla vulgaris* in Juniper Valley, Berkshire. Despite protection by wire netting and barbed wire, erected with the object of excluding sheep and rabbits, few seed heads of the plant survived the flowering season, though the plant flowered annually. In one colony the flower stalks had been nipped off close to the ground when in bud; or the flower itself nibbled away, and in some instances the upper stalk had been bitten through after the seeds had been formed. Investigations carried out suggest that the damage was chiefly caused by rabbits, though mole activity, resulting in root disturbance also appeared to be having an adverse effect on the colonies.—[D.H.K.]

45. Clematis. Keener, S., 1967, A biosystematic study of Clematis Subsection Integrifoliae (Ranunculaceae), *J. Elisha Mitchell scient. Soc.*, **83,** 1-41. A revision of *Clematis* Subsection *Integrifoliae*, with full descriptions, synonomy, keys to the identification of species, geographical data, etc.—[D.H.K.]

46. Ranunculus. Aas, B., 1966, Ranunculus cymbalaria en soleie på marsj, *Blyttia*, **1966,** 389-394. *Ranunculus cymbalaria*, a North American species, has during the last 50 years been recorded from three widely separated localities in Europe, viz. the Skaggerak coast in the border region between Norway and Sweden, on the west coast of Finland, and most recently on two islands off the southern point of Norway. It seems probable that the species was orginally introduced into the first two localities as seed in ships waste, and that sea-borne seed has been carried from one of these colonies to the third locality.—[D.H.K.]

46/10. Ranunculus auricomus L. Julin, E., 1967, Der Formenkreis des Ranunculus auricomus L. in Schwéden, 4. Sippen von R. auricomus s. str. aus Öland, *Ark. Bot.*, **6,** (2-3), 243-308 + 32 plates. A further 32 subspecies of *Ranunculus auricomus* are described from the island of Öland, Sweden.—[D.H.K.]

46/10. Ranunculus auricomus L. Julin, E. & Nannfeldt, J. A., 1967, Der Formenkreis des Ranunculus auricomus L. in Schweden, 3. Sippen von Ranunculus auricomus s. str. aus Uppland, *Ark. Bot.*, **6,** (2-3), 163-241 + 32 plates.

A further 32 new subspecies of *Ranunculus auricomus* are described from Uppland, Sweden.—[D.H.K.]

46/14. RANUNCULUS OPHIOGLOSSIFOLIUS Vill. Holland, S. (Ed.), 1966, *Bedgeworth Nature Reserve. Site of Ranunculus ophioglossifolius Vill.* (*Adder's-tongue spearwort*). Pp. 20. Gloucestershire Trust for Nature Conservation Ltd. Includes notes on *Ranunculus ophioglossifolius* in its historical Gloucestershire station.—[D.H.K.]

46/16. RANUNCULUS HEDERACEUS L. Segal, S., 1967, Some notes on the ecology of Ranunculus hederaceus L., *Vegetatio*, **15**, 1-26.

46/16. RANUNCULUS HEDERACEUS L. Van der Baan, G., 1966, Over het voorkomen van de Klanoptvaterranon-kel, Ranunculus hederaceus L., to Schoorl, *Levende Nat.*, **69**, 79-81.

46/24. RANUNCULUS FICARIA L. 'T.C.D.', 1967, An aberrant Lesser Celandine, Ranunculus ficaria L., *Vasculum*, **52**, 6. Reports an unusual form of *Ranunculus ficaria* in Sawmill Wood near East Butsfield, Co. Durham. In one plant all the flowers had within the outer ring of petals a spiralled group of *c*. 30 green scales, the same size as the petals.—[D.H.K.]

49. AQUILEGIA. Riedl, H., 1967, Die Aquilegia vulgaris-Gruppe in Österreich. Vorläufige Mitteilung, *Öst. bot. Z.*, **114**, 94-100. Notes on the *Aquilegia vulgaris* group in Austria with a key to the identification of species and varieties.—[D.H.K.]

51. PAEONIA. Carniel, K., 1967, Über die Embryobildung in der Gattung Paeonia, *Öst. bot. Z.*, **114**, 4-19. Detailed studies on the embryogeny of a number of species of *Paeonia* including *P. officinalis*.—[D.H.K.]

58/1. PAPAVER RHOEAS L. Loiseau, J., 1966, Observations dans la région de Boutigny, *Bull. Ass. Nat. Loing*, **42**, 120. During an excursion to Boutigny a few plants of *Papaver vestitum* Grenier & Godron were found. Considered as a variety of *P. rhoeas*, of which it has the capsule, it differs in being shorter, less robust and more branched. It is notable for its pale, salmon-pink flowers and very hispid stem with upright hairs.—[E.B.B.]

58/2. PAPAVER DUBIUM L. Lawrence, M. J., 1965, Variation in wild populations of Papaver dubium, 1. Variation within populations: diallel crosses, *Heredity*, **20**, 183-204.

58/2. PAPAVER DUBIUM L. Lawrence, M. J. & Gale, J. S., 1967, The biology of Papaver dubium, *Proc. Bgham. nat. Hist. phil. Soc.*, **21**, 41-42. A request is made for workers to assist with studies on the genetical structure of *Papaver dubium* by recording lists of associated species and their frequencies.—[D.H.K.]

67.→ CRUCIFERAE. Böcher, T. W., 1966, Experimental and cytological studies on plant species, 9. Some arctic and montane Crucifers, *K. danske Vidensk. Selsk. Skr.*, **14**(7), 1-74.

67.→ CRUCIFERAE. Easterly, N. W., 1967, Fruit silhouettes of Ohio Cruciferae, *Castanea*, **32**, 101-104. A number of species of the Cruciferae found in Ohio are illustrated by means of silhouettes. Species which also occur in Britain include *Alliaria petiolata*, *Barbarea vulgaris*, *Arabidopsis thaliana*, *Bunias orientalis*, *Rorippa sylvestris*, *Nasturtium officinale* and *Erysimum cheiranthoides*.—[D.H.K.]

67.→ CRUCIFERAE. Knowles, E., 1967, Cultivars of British wild plants, 7. The Cabbage family, *Gdnrs'. Chron.*, **161**(19), 14. A review of the various species of the Cruciferae in cultivation, in particular the cultivated strains of *Brassica* and *Nasturtium*. *Barbarea vulgaris* fl. pleno and var. 'variegata' are sometimes grown in gardens, but the more popular garden plants are cultivars of *Iberis umbellata*, *Matthiola sinuata* and *M. incana*. *Crambe maritima* and *Cardamine pratensis* fl. pleno are sometimes cultivated.—[D.H.K.]

67.→ CRUCIFERAE. Rollins, R. C., 1966, Chromosome numbers of Cruciferae, *Contr. Gray Herb. Harv.*, **197**, 43-65. Chromosome numbers are given for many American species of the Cruciferae, including a number of species that also occur in Britain.—[D.H.K.]

67.→ Cruciferae. Skwirzyńska, E., 1966-67, *Cruciferae* (3), in Madalski, J. (Ed.), *Atlas Flory Polskiej i Ziem Osciennych* (*Florae Polonicae Terrarumque Adiacentium Iconographia*), **9**(4). Polska Akad. Nauk. Inst. Bot. Warszawa. Line drawings and text are provided for 53 species of the Cruciferae found in Poland, covering genera from *Rapistrum* to *Dentaria*: Cruciferae (4), *op. cit.* **9**(5). Line drawings and text are provided for 40 species of the Cruciferae found in Poland, covering genera from *Camelina* to *Cardaminopsis*.—[D.H.K.]

67. Brassica. Narain, A. & Prakash, S., 1967, Synthesis of a new amphidiploid species of Brassica: B. amarifolia Narain and Prakash, *Nature*, **148**, 198-199. Experimental studies on *Brassica*, including a description of a new amphidiploid species produced by crossing *B. tournefortii* Gouan and *B. nigra*.—[D.H.K.]

70/1. Sinapis arvensis.—See 692. Avena.

75/1. Crambe maritima L. Goodwillie, R. N., 1967, Crambe maritima in Co. Wicklow, *Ir. Nat. J.*, **15**, 307. Records the rediscovery in Co. Wicklow of *Crambe maritima*. The species was last recorded there in 1868.—[D.H.K.]

80/1. Coronopus squamatus (Forsk.) Aschers. Döll, R., 1964, Zur Ökologie und Soziologie von Coronopus squamatus (Forsk.) Aschers., *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **13**, 671-672. Notes on the ecology of *Coronopus squamatus*, including lists of associated species.—[D.H.K.]

88/6. Cochlearia anglica L. Binet, P., 1966, Étude d'écologie expérimentale et physiologiques sur Cochlearia anglica L., 1. l'Études dans l'estuarie de l'Orne, *Oecol. Plant.*, **1**, 1-37.

91. Alyssum. Dudley, T. R. & Cullen, J., 1965, Studies in the Old World Alysseae Hayek, *Feddes Rep.*, **71**, 218-228.

96/1. Armoracia rusticana Gaertn., Mey. & Scherb. Rhodes, A. M., Courter, J. W. & Shurtleff, M. C., 1965, Identification of horseradish types, *Trans. Ill. St. Acad. Sci.*, **58**, 115-122. Studies on the morphological characters of 30 cultivars of *Armoracia rusticana* revealed the presence of three distinct types.—[D.H.K.]

97. Cardamine. Salisbury, E., 1965, The reproduction of Cardamine pratensis L. and Cardamine palustris Petermann particularly in relation to their specialized foliar vivipary and its deflexion of the constraints of natural selection, *Proc. R. Soc., Biol.*, **163**, 321-342.

97/1. Cardamine pratensis L. Berg, C. C., 1967, Cytotaxonomic studies in Cardamine pratensis L. in the Netherlands, *Acta bot. neerl.*, **15**, 683-689. In an extensive cytotaxonomic survey of *Cardamine pratensis* in the Netherlands a large range of somatic chromosome numbers ranging from 28 to 108 were found. As main groups tetraploids with 28-32, octoploids with 56-64, and decaploids with 70-80 chromosomes could be distinguished, the normal numbers of the ploidy levels were 30, 60 and 74-76 respectively. Two subspecies were distinguished on the basis of morphological, ecological and cytological characters—octoploids and decaploids as *C. pratensis* L. subsp. *palustris* (Wimm. & Grab.) Janch. and tetraploids as *C. pratensis* L. subsp. *pratensis*.—[D.H.K.]

97/1. Cardamine pratensis L. Berg, C. C. & Segal, S., 1966, De Pinksterbloem in Nederland, *Gorteria*, **3**, 77-86. Two hundred and forty two specimens of the *Cardamine pratensis* aggregate from 58 Dutch localities were morphologically and cytologically studied. Two forms could be distinguished, viz. a form with usually lower chromosome numbers ($2n = 28 - 32$, rarely up to 52), and another with higher chromosome numbers ($2n = 56 - 84$), which, judging by the criteria applied by Lövkist (*Symb. bot. upsal.*, **14**(2) (1956)), correspond with *C. pratensis* *sensu stricto* and *C. palustris* (Wimm. & Grab.) Peterm., respectively. The frequent occurrence of 'transitional' forms and of specimens which are difficult to place, in conjunction with a number of cytological, genetical and geographical arguments, make the present authors feel that, chiefly for practical reasons, it is preferable to treat the two forms as subspecies. The two taxa can be clearly distinguished in many, though not in all, instances. The following differential characters are considered to be of diagnostic value:

C. pratensis L. subsp. *pratensis*: rosette leaves smaller with a mean number of pinnae of 4·1; segments of cauline leaves in most cases sessile and smaller; stem usually straight and erect, but rarely over 30 cm tall; mean number of flowering lateral shoots 3; mean value of length of sepals 3·6 mm, of width 2·0 mm; mean length of petals 10·3 mm and mean width 5·5 mm; mean length of filaments 3·4 and 5·2 mm and of anthers 1·7; mean length of siliqua 27 mm; chromosome number usually varying between 28 and 52; flowering season starting relatively early; a nocturnal nastic change of position ('sleeping') of the flower; vegetative propagation organs rarely developed; prefers a relatively drier habitat, mainly in grasslands and in forests on basic soils.

C. pratensis L. subsp. *palustris* (Wimm. & Grab.) Janchen: rosette leaves larger with a mean number of pinnae of 5·5; segments of cauline leaves usually petiolulate and broader, to broadly elliptic in outline; stem thicker, stouter and more fleshy and frequently showing a torsion about the longitudinal axis; number of flowering lateral shoots upon the average 1, in addition vegetative side shoots often present; mean length of sepals 4·7 mm, mean width 2·5 mm; mean length of petals 12·7 mm, their mean width 7·6 mm; colour of corolla often lighter (to almost completely white); mean length of filaments 4·5 mm and 6·6 mm and of anthers 2·3 mm; mean length of siliqua 38 mm; chromosome number 56-84; flowering season starting one to two weeks later; no nastic changes in position ('sleeping') of flower; adventitious shoots common on rosette leaves, sometimes (also) on stem leaves; prefers wetter habitats, especially in riparian and 'floating island' vegetation and in older carr.

The nature of these differences is characteristic of many similar cases of polyploidy (disploidy) and has no specific qualitative indication value. It is feasible that after a more detailed analysis 'cytoclines' can be recognized. There is some evidence for the view that the cytological and morphological range in variation is relatively large in habitats which are unstable in an ecological sense and relatively small in stable habitats.—[Authors' summary]

100. ARABIS. Novotná, I., 1966, Die Anwendung der graphischen Methode des Vergleiches von Pflanzenhabiti bei der P- und F- Generation innerhalb des Komplexes Arabis hirsuta, *Folia Geobot. Phyt. Taxon Bohemica*, **3**, 243-267. Biometrical studies on the European *Arabis hirsuta* complex.—[D.H.K.]

100. ARABIS. Titz, W., 1967, Zur Cytologie und Systematik einiger österreichischer Arabis-Arten, *Ber. dt. bot. Ges.*, **79**, 474-487. Cytotaxonomic studies on the Austrian species of *Arabis*. The following chromosome numbers are reported:— *A. glabra*, $2n = 12$; *A. turrita*, $2n = 16$; *A. alpina*, $2n = 16$.—[D.H.K.]

100/1. ARABIS TURRITA L. Gaukler, K., 1965, Arabis turrita die Turm-Gänsekresse, ein isolierter Vorposten südlicher Flora in Franken, *Naturf. Ges. Bamberg Ber.*, **39**, 39-44.

101. TURRITIS. Dvořák, F., 1967, A note on the genus Turritis L., *Öst. bot. Z.*, **114**, 84-87. The genus *Turritis* L. differs from the genus *Arabis* L. by the arrangement of the myrosine cells and by the alignment of the seeds in the pods in two rows. The anatomical structure of the septum is not a character differentiating the genus *Arabis* from the genus *Turritis*. The author supports the view that it would be more correct to evaluate the genus *Turritis* only as an infrageneric taxon of the genus *Arabis*.—[Author's summary]

101. TURRITIS. Dvořák, F. & Uhířová, V., 1967, The variability in the nectaries of the genus Turritis, *Öst. bot. Z.*, **114,** 1-3.

102/4. RORIPPA ISLANDICA (Oeder) Borbás. Stuckey, R. L., 1966, Differences in habitats and associates of the varieties of Rorippa islandica in the Douglas Lake region of Michigan, *Michigan Bot.*, **5,** 99-108.

105. ERYSIMUM. Favarger, C., 1965, Sur quelques Erysimum de la flore française, *Monde des Plantes*, **348,** 1-4.

105. ERYSIMUM. Jankun, A., 1966, Badania kariologiczne nad rodzajem Erysimum L., *Acta biol. cracov., Sér. bot.*, **8,** 245-248. Karyological studies on Polish species of *Erysimum.* The chromosome number of *E. cheiranthoides* is $2n = 16$ which agrees with counts made elsewhere in Europe.—[D.H.K.]

105. ERYSIMUM. Snogerup, S., 1967, Studies in the Aegean Flora, 8. Erysimum sect. Cheiranthus, A. Taxonomy, *Op. bot.*, **13,** Pp. 70. A revision of *Erysimum* section *Cheiranthus* in the Aegean area, with descriptions, synonymy, keys to the identification of the various species, etc.: 9, Erysimum sect. Cheiranthus, B. Variation and evolution in the small population system, *loc. cit.* **14.** Pp. 86. Further studies on *Erysimum* sect. *Cheiranthus* in the Aegean area.—[D.H.K.]

108/2. SISYMBRIUM IRIO L. Misra, R. C., 1966, Morphological studies on Sisymbrium irio Linn., *J. Indian bot. Soc.*, **45,** 14-23.

108/2. SISYMBRIUM IRIO L. Rasch, W., 1966, Sisymbrium irio L. återfunnen i Stockholm, *Svensk. bot. Tidskr.*, **60,** 442-443. Reports the rediscovery of the adventive *Sisymbrium irio* in Stockholm.—[D.H.K.]

109/1. ARABIDOPSIS THALIANA (L.) Heynh. Anand, R. & Maheshwari, S. C., 1966, Germination and flowering in Arabidopsis thaliana in sterile culture, *Physiologia Pl.*, **19,** 1011-1019.

109/1. ARABIDOPSIS THALIANA (L.) Heynh. Fujii, T., 1966, Effects of ultraviolet-rays or Arabidopsis thaliana, *Rep. natn. Inst. Genet., Japan*, **16,** 118-119.

112. RESEDA.—See 326.→ URTICACEAE.

113. VIOLA. Harvey, M. J., 1966, Cytotaxonomic relationships between the European and North American rostrate violets, *New Phytol.*, **65,** 469-476. Four European and three North American species of *Viola* belonging to the subsection *Rostratae* were investigated cytotaxonomically to determine the likelihood of a past trans-Atlantic migration of genomes. By analysis of meiotic pairing in hybrids it was concluded that two species, *Viola rupestris* and *V. adunca* Sm., were closely related, but from geographical evidence it seemed more likely that some ancestral species had migrated from Asia to North America via Beringia and not across the north Atlantic region.

In most hybrids there was considerable failure of chromosome pairings at meiosis and it was concluded that there are no close trans-Atlantic relationships between the remaining species despite their interesting geographical distributions which had partly suggested the investigation in the first place.

The chromosome numbers and distributions of the plants investigated are reported.—[Author's summary]

113. VIOLA. Knowles, E., 1967, Cultivars of British wild plants, 6, Violets and Pansies, *Gdnrs' Chron.*, **161** (18), 14. Many hortal forms of violets and pansies are derived from *Viola tricolor* and *V. lutea.* The common garden pansy (*Viola* × *wittrockiana* Gams (*V. lutea* × *tricolor*)) has escaped from gardens and back-crossed with *V. tricolor.*—[D.H.K.]

115. HYPERICUM. Kaasa, J., 1966, Characters which separate Hypericum maculatum Cr. and H. perforatum L., *Blyttia*, **1966,** 247-250. A study of Scandinavian herbarium material has shown considerable variation in *Hypericum maculatum* and *H. perforatum* which previously had not been regarded as difficult to separate.

The chief morphological characters hitherto used to distinguish the two species from each other are the lines, or ribs, on the stems, shape of sepals, and the translucent glands in the leaves. *H. perforatum* as distinct from *H. maculatum* has two raised lines on the stem, but there occur forms with four lines giving a ± quadrangular appearance. Normally *H. maculatum* has quite blunt sepals while those of *H. perforatum* are very pointed, but again there is considerable variation in both species. Some forms of *H. maculatum* have, like *H. perforatum*, transluscent glands on the leaves.

The best character that the author has found for separating the two species are the veins on the ventral side of the leaves. In *H. maculatum* the network of veinlets look almost fine-meshed, while in *H. perforatum* the main nerve and some of the side nerves only are visible. Furthermore, all the nerves and veinlets in leaves of *H. maculatum* are pellucid whereas in *H. perforatum* they are opaque.

H. maculatum × *perforatum* (*H.* × *desetangsii*), though reported from a number of western European countries is unrecorded for Scandinavia. The presence of this hybrid may be responsible for the apparent variation in character of the two species.—[D.H.K.]

115. HYPERICUM. Stjepanović, L., Corović, M., Nikolić, R., Pavlović, S. & Zivanović, P., 1964, Promenljvost morfološko-anatomskih karaktera vrsta roda Hypericum na planini Tara u Zavisnosti od uslova staništa, *Glasn. Priord. Muz. Belgrad.* (*Biol.*), **19,** 127-154. Studies on the morphology and anatomy of a number of *Hypericum* species.—[D.H.K.]

115/5. HYPERICUM PERFORATUM L. Omelchuk-Myakushko, T. Y., 1966, Do biologiji zviroboju zvyuajnogo (Hypericum perforatum L.), *Uk. Bot. Zh.*, **23,** 100-104. Notes on the biology of *Hypericum perforatum*.—[D.H.K.]

118. HELIANTHEMUM. Knowles, E., 1967, Cultivars of British wild plants, 17. Rock-roses and Cinquefoils, *Gdnrs' Chron.*, **162** (4), 14. Forms of *Helianthemum nummularia* and *H. apenninum* are in cultivation, while among cultivars of the species of *Potentilla* grown in gardens are those of *P. fruticosa*, *P. crantzii* and *P. reptans*.—[D.H.K.]

118. HELIANTHEMUM. Wilbur, R. L. & Daoud, H. S., 1967, A synopsis of the genus Helianthemum (Cistaceae) in Mexico and Central America, *SWest. Nat.*, **12,** 87-96.

118. HELIANTHEMUM.—See 326.→ URTICACEAE.

120. TAMARIX. Baum, B., 1964, On the Vernales-Aestivales character in Tamarix and its diagnostic value, *Israel J. Bot.*, **13,** 30-35.

120. TAMARIX. Baum, B., 1966, *Monographic revision of the genus Tamarix; Final Research Report*. Pp. iii + 193. Department of Botany, Hebrew University, Jerusalem.

120. TAMARIX. Baum, B. R., 1967, Introduced and naturalized Tamarisks in the United States and Canada [Tamaricaceae], *Baileya*, **15,** 19-25. The genus *Tamarix* is Eurasian and African in origin but some species have been introduced and have become extensively naturalized in America. Material from seven United States and Canadian herbaria was examined. The following species were recorded: *T. africana* (L.) Karst., *T. aralensis* Bunge, *T. canariensis* Willd., *T. chinensis* Low., *T. gallica* L., *T. parviflora* DC. and *T. ramosissima* Ledeb. A key, short descriptions, and distribution of species are given.—[Author's summary]

123. SILENE. Van Nigtevecht, G., 1966, Genetic studies in dioecious Melandrium, 1. Sex-linked and sex-influenced inheritance in Melandrium album and Melandrium dioicum, *Genetica*, **37,** 281-306: 2. Sex determination in Melandrium album and Melandrium dioicum, *loc. cit.*, **37,** 307-344.

123. SILENE.—See 384. GENTIANA.

123/2. SILENE MARITIMA With. Baker, H. G., 1966, The evolution of floral heteromorphism and gynodioecism in Silene maritima, *Heredity*, **21**, 689-692.

123/13. SILENE DIOICA (L.) Clairv. Vassileva-Dryanovska, O. A., 1966, Induced chromosomal aberrations and other abnormalities in the embryosac following pollen irradiation in Melandrium rubrum, *Hereditas*, **55**, 149-159.

123/13. SILENE DIOICA (L.) Clairv. Vignon, F. & Lebègne, A., 1966, Embryogenie des Caryophyllacées. Développement de l'embryon chez le Melandrium rubrum Garcke, *C. r. hebd. Séanc, Acad. Sci., Paris*, **262**, 2149-2152.

123/13. SILENE DIOICA (L.) Clairv.—See 124. LYCHNIS.

123/14. SILENE ALBA (Mill.) E. H. L. Krause. Dean, H. L. & Smith, S. K., 1965, Androhermaphrodites of Lychnis alba, *Proc. Iowa Acad. Sci.*, **71**, 91-103.

124. LYCHNIS. Gunckel, H., 1964, Dos especies del genéro Lychnis (fam. de las Cariofolaceas) adventiacias observados en Chile central, *Revta. Univ. (Chile)*, **49**, 75-79. *Silene dioica*, *Lychnis chalcedonica* and *L. coronaria* are reported as established adventives in Chile.—[D.H.K.]

124. LYCHNIS.—See 384. GENTIANA.

127. DIANTHUS.—See 384. GENTIANA.

128/1. VACCARIA PYRAMIDATA Medic. Goering, K. J., Eslick, R. F., Watson, C. A. & Keng, J., 1966, Utilization and agronomic studies of Cow Cockle (Saponaria vaccaria), *Econ. Bot.*, **20**, 429-433.

129/1. SAPONARIA OFFICINALIS L.—See 384. GENTIANA.

130. PETRORHAGIA (KOHLRAUSCHIA) Favarger, C., 1966, Contribution à la cytotaxinomie du genre Petrorhagia (= Tunica), *Ber. schweiz. bot. Ges.*, **76**, 270-278.

131/8, CERASTIUM GLOMERATUM Thuill. Guignard, J.-L., 1966, Embryogéisie des Caryophyllacées. Développement de l'embryon chez le Cerastium glomeratum Thuill., *C. r. hebd. Séanc. Acad. Sci., Paris*, **263**, 856-859.

136/6. SAGINA SAGINOIDES (L.) Karst.—See 384. GENTIANA.

137/1. MINUARTIA VERNA (L.) Hiern.—See 384. GENTIANA.

142/2. SPERGULA MORISONII Bor. Londo, G., 1967, Groeiplaats van Spergula vernalis Willd. in de duinen bij Vogelenzang, *Gorteria*, **3**, 157-160. *Spergula morisonii* (as *S. vernalis*), a rather common species on the pleistocene soils in the central and eastern parts of the Netherlands, is very rare in the inner dunes. More or less in contrast to the circumstances on the first mentioned soils, the species occurs in the dunes in stabilized lichen-vegetation and is intolerant to any drift of sand.—[Author's summary]

143. SPERGULARIA. Sterk, A. A., 1966, Some remarks on the variability of Spergularia marginata and Spergularia salina in the Netherlands, *Proc. K. ned. Akad. Wet. Biol. Med. Sci.*, **69**, 50-57. An analysis of samples from populations of *Spergularia media* and *S. salina* in the Netherlands showed that the two species were clearly definable. No intermediates were found, but in certain habitats a form of *S. media* occurred with exclusively unwinged seeds. *S. salina*, had a form with broadly winged seeds only, though this was noted in only one locality.—[D.H.K.]

143/4. SPERGULARIA MEDIA (L.) C. Presl. Vignon, F., 1966, Embryogénie des Caryophyllacées. Développement de l'embryou chez le Spergularia marginata Kittel, *C. r. hebd. Séanc. Acad. Sci., Paris*, **263**, 505-508.

144/G. GYPSOPHILA PANICULATA L. Darwent, A. L., Coupland, R. T. & Skoglund, N. A., 1967, The potential of Gypsophila paniculata as a weed in Saskatchewan, *Can. J. Pl. Sci.*, **47**, 125-134. *Gypsophila paniculata*, an ornamental species of Eurasian origin, was introduced into cultivation in western Canada more than 80 years ago. It is now known as a naturalized or established garden escape in at least 50 localities in Saskatchewan, and mature plants are able to withstand extreme fluctuations in rainfall, and live for many years. Heavy continuous grazing suppresses the growth of many mature plants and prevents the establishment of seedlings in many grassland areas.—[D.H.K.]

148. Scleranthus. Trela-Sawicka, Z., 1966, Badania cytologiczne nad rodzajem Scleranthus L., *Acta biol. cracov., Sér. bot.*, **9,** 59-63. Cytotaxonomic studies on the Polish species of *Scleranthus. S. perennis* is a diploid with $2n = 22$, and *S. annuus* and *S. polycarpos* are tetraploids with $2n = 44$. The distribution, habitat preferences and ecology of the three species is reviewed.—[D.H.K.]

148/1(2). Scleranthus polycarpos L. Jansen, M. T. & de Kleuver, J. A. E., 1967, Een nieuwe groeiplaats van Scleranthus polycarpos L., *Gorteria*, **3,** 155-156. *Scleranthus polycarpos*, first discovered in the Netherlands in 1966, has now been found in large quantity on river dunes near Bergharen (prov. Gelderland).—[D.H.K.]

149/3. Montia sibirica (L.) Howell. McMahon, C., 1967, Montia sibirica (L.) Howell (Claytonia sibirica L., C. alsinoides Sims), *Ir. Nat. J.*, **15,** 305. Records the discovery of the American adventive *Montia sibirica* in the grounds of Stranmillis College, Belfast.—[D.H.K.]

151. Portulaca. Bourharmont, J., 1965, Note sur la cytologie de quelques espèces de Portulaca, *Bull. Soc. r. bot. Belg.*, **98,** 175-188.

151/C. Calandrinia. Van Ooststroom, S. J. & Reichgelt, T. J., 1966, De in Nederland adventieve en verwilderde Calandrinia-soorten, *Gorteria*, **3,** 87-89. Two species of *Calandrinia* Humb., Barth. & Kunth have been found in the Netherlands as aliens or escapes from cultivation: *C. elegans* Spach, from California and *C. compressa* Schrad. ex DC., from Chile. They can be distinguished as follows:—

1 Leaves of the involucre ('calyx') free, ovate, acuminate at the apex, about half as long as the perianth ('corolla'), in fruit 8-12 mm long. Capsule slightly shorter than, to as long as, the involucre 1. *C. elegans*

2 Leaves of the involucre connate at the base, slightly shorter than the perianth, in fruit 5-7 mm long, the free portion broadly triangular and acute. Capsule longer than the involucre 2. *C. compressa*

—[Authors' summary]

153. Amaranthus. Hunziker, A. T., 1965, Estudios sobre Amaranthus, 5. Revision de las especies Americanas con 1A4 estambres 1A5 tepalos, e inflorescencias exclusivamente axilares, *Kurtziana*, **2,** 27-52. A revision of the American *Amaranthus albus* group, with full descriptions, synonomy, keys to the identification of the various species, etc. Illustrations of some of the species are provided.—[D.H.K.]

153. Amaranthus. Hunziker, A. T., 1966, Estudios sobre Amaranthus, 6. Notas taxonomicas sobre especies sudamericanas, *Kurtziana*, **3,** 201-214. Several new species of *Amaranthus* are described from South America, and the presence in South America of the North American *A. retroflexus* as an established adventive is confirmed by recent finds in Argentina, Ecuador and Uruguay.—[D.H.K.]

153. Amaranthus. Kovachev, L., 1965, On the system of the genus Amaranthus L., *C. r. Séanc. Acad. Sci. (Bulg.)*, **18,** 647-650.

153. Amaranthus. Lorenzoni, G. G. & Ziliotto, U., 1967, Il genere 'Amarantus' dell'erbario Veneto dell'istituto botanico dell Universita di Padova, *G. bot. ital.*, **72,** 605-612. A revision of *Amaranthus* in Italy, based on studies on herbarium material at Venice and Padua.—[D.H.K.]

156/1. Atriplex littoralis L. Davis, T. A. W., 1967, Atriplex littoralis in Pembrokeshire, *Nature Wales*, **10,** 125-126. Records the discovery of a colony of

Atriplex littoralis in Pembrokeshire. The species is new to the county despite the fact that it is growing in an area known to the author for many years. The nearest locality to Pembrokeshire where *A. littoralis* grows is the Gwendraeth estuary, near Kidwelly, Carmarthenshire, and it is presumed that seed was carried from there to the Pembrokeshire station by the tide. A list of associated species is given.—[D.H.K.]

157/1. HALIMIONE PORTULACOIDES (L.) Aellen. Teather, D. C., 1965, Some factors limiting the distribution of Halimione portulacoides (L.) Aell. var. latifolia (Gussone): submergence and soil type, *Trans. Lincs. Nat. Un.*, **16,** 90-98. Experimental studies on *Halimione portulacoides* at Saltfleeby Marsh, N. Lincs. showed that waterlogging increased seedling mortality and decreased growth rate of mature plants. Optimum growth conditions occurred at inundation periods between one and four and a half hours per day, the optimum period for the quickly draining sand being longer than for the more slowly draining soils.—[D.H.K.]

160. SALICORNIA. Knoerr, A., 1966, Salicornia herbacea L. sensu lato dans le Bouches-du-Rhône, *Monde des Plantes*, **352,** 4-6.

162/2. TILIA CORDATA Mill. Hesmer, H., 1966, Ecological and silvicultural behaviour of the little leaf linden (Tilia cordata), *Bundesmin. Ernahr. Landwirt. Forsten. Forsch. Forderung Forstl. Erzeug*, **5,** 17-19.

163. MALVA. Mortier, J., 1967, Embryologie des Malvacées. Polyembryonie chez le Malva silvestris L. et le Malva moschata L., *Bull. Soc. bot. Fr.*, **113,** 229-232.

163/7. MALVA VERTICILLATA L. Danert, S., 1966, Zur morphologie und systematik von Malva verticillata L., *Kulturpflanze*, **14,** 495-510. A revision of the varieties and forms of *Malva verticillata*, with descriptions and keys. Two new varieties var. *rosulata* and var. *tibetica* are described from Tibet. The species has long been cultivated in western Europe, and sometimes occurs as an established garden escape.—[D.H.K.]

164. LAVATERA. Fernandes, R. B., 1967, Notes taxinomiques sur le genre Lavatera L., *Feddes Rep.*, **74,** 18-20. A number of nomenclatural changes are made in *Lavatera*.—[D.H.K.]

166. LINUM. Ockendon, D. J., 1967, Notes on the Linum perenne group, *Feddes Rep.*, **74,** 20-22. A revision of the *Linum perenne* group. *L. anglicum* Mill. is reduced to **L. perenne** L. subsp. **anglicum** (Mill.) Ockendon, comb. nov.—[D.H.K.]

168. GERANIUM. Carolin, R. C., 1965, The genus Geranium L. in the south-western Pacific area, *Proc. Linn. Soc. N. S. W.*, **89,** 326-361.

168. GERANIUM. Leifertová, I., Buckhová, H. & Natherová, L., 1965, K chemotaxonomii znaků trislovin u rodu Geranium, *Preslia*, **37,** 413-418.

168/6. GERANIUM PHAEUM L. Van der Voo, E. E., 1966, Een aanvullende mededeling betreffende Geranium phaeum L., *Gorteria*, **3,** 89-90. *Geranium phaeum* is recorded as an established garden escape near Linschoten (prov. Utrecht), Netherlands.—[D.H.K.]

169. ERODIUM. Guittonneau, G., 1965, Note sur la découverture de la polysomatie dans le genre Erodium L'Hér., *C. r. hebd. Séanc. Acad. Sci., Paris*, **260,** 5332-5335.

170. OXALIS. Tideman, A. F., 1966, Weeds worth watching. 'The Soursobs', *J. Dep. Agric. S. Aust.*, **70,** 102-105. Four species of *Oxalis*—*O. bowiei* Ait., *O. compressa* Jacq., *O. flava* Jacq. and *O. purpurea* Willd. have spread from gardens into natural and semi-natural habitats in South Australia. The four species are described and illustrated. *O. pes-caprae* has also become naturalized in the state, and other species of *Oxalis* are undoubtedly present. The author points out that it is essential that plants from suspected *Oxalis* 'outbreaks' should be accurately identified. Various methods of controlling *Oxalis* species are discussed.—[D.H.K.]

171. Impatiens. Daumann, E., 1967, Zur Bestäubungs-und Verbreitungsokölogie dreier Impatiens-Arten, *Preslia*, **39,** 43-58.

171/2. Impatiens capensis Meerb. Ornduff, R., 1966, Impatiens capensis in Oregon: native or naturalized?, *Leafl. west. Bot.*, **10,** 317-319. The distribution of *Impatiens capensis* as a native species in North America is reviewed. In Oregon it has a peculiar habitat preference for crevices in old floating logs of log rafts, moorings and pilings, and has not been noted growing on soil on adjacent river banks. The conclusion reached is that *I. capensis* is a naturalized introduction in Oregon.—[D.H.K.]

171/4. Impatiens glandulifera Royle. Gondola, I., 1965, Az Impatiens glandulifera Royle terjedése a Nyugat-Dunántál vizparti növénytársulásaiban, *Bot. Közl.*, **52,** 35-46.

171/4. Impatiens glandulifera Royle. Lhotská, M. & Kopecký, K., 1966, Zur Verbreitungsbiologie und Phytozonologie von Impatiens glandulifera Royle an den Flussystemen der Svitava, Svratka und oberen Odra, *Preslia*, **38**, 376-385. Studies on the growth and spread of the Himalayan adventive *Impatiens glandulifera*, as a naturalized garden escape, along the river systems of Czechoslovakia.—[D.H.K.]

173. Acer. Djavanchir-Khoie, K., 1967, *Les Erables de l'Iran. Deuxième thèse Montpellier Faculté des Sciences-Institut de Botanique*. Pp. 39. A revision of *Acer* in Iran, with descriptions, keys to species and varieties, synonymy, geographical distribution and illustrations of the leaves and fruits of the various species. Most of the species also found in Britain are included in the account.—[D.H.K.]

173. Acer. Edlin, H. L., 1967, A modern sylva, or a discourse of Forest Trees, 21. Sycamore and Maples -Acer genus, *Q. Jl. For.*, **61,** 123-130.

173/1. Acer pseudoplatanus L. Galoux, A. & Falkenhagen, E., 1965, Studies in the ecological variability of Acer pseudoplatanus in Belgium, 1. The samara correlations and growth in the seedling stage, *Trav. stn. Rech. Groenedaal., ser. A*, **10,** 1-60.

173/1. Acer pseudoplatanus L. Mestre, J. C., 1965, Embryogénie des Acéracées. Developpement de l'embryon chez l'Acer pseudo-platanus L., *C. r. hebd. Séanc. Acad. Sci., Paris*, **261,** 5602-5604.

173/1. Acer pseudoplatanus L. Zareba, R., 1966, Zasieg nizinny jaworu w Polsce środkowej w naturalnych zespotach lésmych, *Fragm. Flor. geobot.*, **12,** 413-422. Studies on the distribution of *Acer pseudoplatanus* in lowland natural forest associations in central Poland.—[D.H.K.]

175/1. Aesculus hippocastanum L. Suszka, B., 1966, Warunki ustepowania speczynku i klelkowania naston kasztanowia bialego (Aesculus hippocastanum L.), *Arboretum Kórn. Roczn.*, **11,** 203-220. Studies on the conditions necessary for the breaking of dormancy in the seeds of *Aesculus hippocastanum*, and upon their germination.—[D.H.K.]

176/1. Ilex aquifolium L. Hu, Shiu-ying, 1967, The evolution and distribution of the species of Aquifoliaceae in the Pacific area, *J. Jap. Bot.*, **42,** 13-27 & 49-59. Includes notes on *Ilex aquifolium*.—[D.H.K.]

177/1. Euonymus europaeus L. Kotov, M. I., 1966, Bruslyna Jevropejs'ka (Evonymus europaea L.) ta jijl minlyvist', *Ukr. bot. Zh.*, **23,** 102-105. Notes on the variability of *Euonymus europaeus* in the Ukraine.—[D.H.K.]

178/1. Buxus sempervirens L. Michel, E., 1966, Le Buis (Buxus sempervirens L.), *Naturalistes belg.*, **47,** 349-354. An account of *Buxus sempervirens* in Belgium.—[D.H.K.]

182. PARTHENOCISSUS. Webb, D. A., 1967, What is Parthenocissus quinquefolia (L.) Planchon?, *Feddes Rep.*, **74**, 6-10. The author points out that two species are commonly regarded as *Parthenocissus quinquefolia* in Europe. **P. inserta** (Kerner) Fritsch, from southern Canada and the northern and western parts of the United States, and *P. quinquefolia* (L.) Planchon, from the eastern part of the United States, just extending to S.E. Canada and extending southward to Mexico. The two species overlap in New England, the part of the United States bordering the Great Lakes and a small area of Canada. The two species differ as follows:—

Parthenocissus inserta (Kerner) Fritsch (*Vitis inserta* Kerner, *Cissus quinquefolia* Soland. ex Sims, *Parthenocissus vitacea* A. S. Hitchcock, *P. quinquefolia* sensu Graebner, Janchen, et auct. nonnull. europ. med., non L.)—Leaflets boldly toothed, green and shining beneath, tendrils with 3-5 branches, twining or with swollen tips, but without adhesive discs; inflorescence small, with dichotomous branching.

Parthenocissus quinquefolia (L.) Planchon (*Hedera quinquefolia* L., *Parthenocissus pubescens* (Schlecht.) Graebner, *Vitis hederacea* Ehrh., *Ampeolopsis muralis* Lengerken, *Quinaria radicantissima* Koehne, *Ampeolopsis graebneri* Bolle).—Leaflets with somewhat shallower teeth, dull and slightly glaucous beneath; tendrils with 5-8 (or more) branches, which develop on contact adhesive discs; in florescence larger with several lateral branches.

Both species are commonly cultivated in western Europe and both occur as established escapes.—[D.H.K.]. [Examination of *Parthenocissus* populations in Middlesex during 1967 have revealed that both species are present as established escapes].—[D.H.K.]

183.→ LEGUMINOSAE. Gilot, J., 1965, Contribution à l'étude cytotaxonomique des Genistae et des Loteae, *Cellule*, **65**, 317-347.

183.→ LEGUMINOSAE. Leppik, E. E., 1966, Floral evolution and pollination in the Leguminosae, *Annls. Bot. Fenn.*, **3**, 299-308.

183. LUPINUS. Dunn, D. B. & Gillett, J. M., 1966, *The Lupines of Canada and Alaska. Research Branch, Canada Department of Agriculture Monograph No.* 2. Pp. 89. Ottawa. A revision of the Canadian and Alaskan species of *Lupinus*, with descriptions, keys, synonymy, illustrations of the species and distribution maps. Most of the species of *Lupinus* naturalized or established in Britain are included in the account.—[D.H.K.]

183. LUPINUS. Hackbarth, J., 1966, Polyploidie in der Gattung Lupinus, *Acta Agric. scand. Suppl.*, **16**, 253-255.

185. GENISTA. Gibbs, P. E., 1966, A revision of the genus Genista L., *Notes R. bot. Gdn. Edinb.*, **27**, 11-99. A revision of *Genista*, with descriptions, keys to species and varieties, synonymy, distribution maps of the various species, etc.—[D.H.K.]

187. ULEX. Webb, D. A., 1967, Some taxonomic notes on Ulex sensu lato, *Feddes Rep.*, **74**, 4-6.

187/1. ULEX EUROPAEUS L. Bieniek, M. E. & Millington, W. F., 1967, Differentiation of lateral shoots as thorns in Ulex europaeus, *Am. J. Bot.*, **54**, 61-70.

188/1. SAROTHAMNUS SCOPARIUS (L.) Wimm. ex Koch. Waloff, N., 1966, Scotch Broom (Sarothamnus scoparius (L.) Wimmer) and its insect fauna introduced into the pacific northwest of America, *J. appl. Ecol.*, **3**, 293-311.

190. MEDICAGO. Kožuharov, S., 1965, Vidovete na rod Medicago L. (Ljucerna) v Bulgarija, *Izv. bot. Inst. Sof.*, **15**, 119-188. A revision of the perennial species of *Medicago* found in Bulgaria.—[D.H.K.]

190. MEDICAGO. Lesins, K. & Lesins, I., 1965-66, Little known Medicagos and their chromosome complements, 3. Some Mediterranean species, *Can. J. Genet. Cytol.*, **7**, 97-102: 4. Some mountain species, *loc. cit.*, **8**, 8-13.

190. MEDICAGO. Quinlivan, B. J., 1965, The naturalised and cultivated annual medics of Western Australia, *J. Agric. West. Aust.*, **6,** 532-543.

190. MEDICAGO. Simon, J. P. & Simon, A., 1965, Relationship in annual species of Medicago, 1. Number and morphology of chromosomes, *Aust. J. agric. Res.*, **16,** 37-50.

190/1. MEDICAGO FALCATA L. Snagovskaja, M. S., 1966, Sravnitel'naja kharakteriska populjacij Medicago falcata v raznykh ekologceskikh uslovijakh, *Bjull. Mosk. Obsc. Isp. Prir.* (*Biol.*) **71** (4), 51-59.

190/2. MEDICAGO SATIVA L.—See 718/1. ECHINOCHLOA CRUS-GALLI (L.) Beauv.

191. MELILOTUS. Kita, F., 1966, Studies on morphology of the somatic chromosomes of the genus Melilotus (sweet clover), *Jap. J. Bot.*, **19,** 149-174.

191. MELILOTUS. Schlosser-Szigat, G., 1966, The biology of Melilotus as a basis for its cultivation and use, *Albrecht-Thaer-Arch.*, **10,** 769-786.

192. TRIFOLIUM. Hendrych, R., 1967, Trifolium retusum in der Tschechoslowakei, *Preslia*, **39,** 30-42. *Trifolium retusum* Höjer, a subcontinental-submediterranean species is recorded as new to Czechoslovakia, and the distributions of various other species of *Trifolium*, including *T. suffocatum* and *T. glomeratum*, in that country are reviewed and discussed.—[D.H.K.]

192. TRIFOLIUM. Katznelson, J., 1966, A taxonomic revision of Sect. Calycomorphum of the genus Trifolium, 2. The anemorich species, *Israel J. Bot.*, **14,** 171-183.

192/2. TRIFOLIUM PRATENSE L. Ghidoni, A. & Grazi, F., 1965, Ottenimento di poliploidi in Trifolium pratense a seguito di trattamenti con colchicina, *Caryologia*, **18,** 327-347.

192/13. TRIFOLIUM SUBTERRANEUM L. Gladstones, J. S., 1966, Naturalized subterranean clover (Trifolium subterraneum L.) in Western Australia: the strains, their distributions, characteristics and possible origins, *Aust. J. Bot.*, **14,** 329-354. Seventy two previously undescribed strains of *Trifolium subterraneum* were gathered around Perth and in some of the older Western Australian farming districts between 1960 and 1962. These strains are briefly described and their known distributions given.

Many of the strains were probably introduced into Australia during the early and mid-nineteenth century, and because this was prior to the construction of the Suez Canal it seems possible that they originated in England, Portugal and the Canary Islands rather than from the Mediterranean region as has been previously suggested. Most of the introduced strains appear to have first become established in coastal regions of Western Australia and to have been carried inland with imported hay or similar materials.—[D.H.K.]

192/18. TRIFOLIUM REPENS L. Staszewski, Z., 1966, Bodania nad koniczyna biota olbrzymia—Trifolium repens L. v. typicum Aschers. et Graebn. f. giganteum Lagr. et Fasset, *Hodowla. Rósl. Aklim. Nasienn.*, **10,** 151-173. Cytotaxonomic studies on *Trifolium repens* var. *typicum* and its f. *giganteum*.—[D.H.K.]

192/19. TRIFOLIUM FRAGIFERUM L. Davies, W. E. & Young, N. R., 1966, Self-fertility in Trifolium fragiferum, *Heredity*, **21,** 615-624.

195. LOTUS. Borsos, O., 1966, Mikrotaxonomische Bearbeitung der Artengruppe Lotus corniculatus L. agg. in der pannonischen und karpatischen Flora, *Acta bot. hung.*, **12,** 255-283. A systematic account of the subspecies, varieties and forms of *Lotus corniculatus* and allied species found in Hungary and adjacent countries. Numerous new forms are described. A key is provided to the identification of the various taxa.—[D.H.K.]

195. LOTUS. Grant, W. F. & Sidhu, B. S., 1967, Basic chromosome number, cytogenetic glucoside variation and geographic distribution of Lotus species, *Can. J. Bot.*, **45,** 639-647.

195. LOTUS. Chrtková-Zertová, A., 1967, Some chromosome numbers in the Czechoslovak Leguminosae, 1. Lotus, *Folia Geobot. Phyto-Taxonom. Bohem.*, **2,** 197-199. The following chromosome counts are given for Czech *Lotus* species:—*L. uliginosus* (11 populations), $2n = 12$; *L. tenuis* (5 populations), $2n = 12$; *L. borbasii* Ujhely; (15 populations), $2n = 21$.—[D.H.K.]

195. LOTUS. Zertová, A., 1966, Bemerkungen zu den Arten aus dem Verwantschafskreis der Gesamtart Lotus corniculatus L. in Nord Jugoslawien, *Acta bot. croat., vol. extr.*, **1964,** 139-143.

195/3. LOTUS ULIGINOSUS Schkuhr. Zimny, H., 1965, Studia nad ekologie, komonicy bletnej (Lotus uliginosus Schk.), *Fragm. Flor. geobot.*, **11,** 393-408. Studies on the ecology of *Lotus uliginosus* in Poland.—[D.H.K.]

201. OXYTROPIS. Boivin, B., 1967, Études sur les Oxytropis DC., 2. *Naturaliste can.*, **94,** 73-78. Studies on the variation of Canadian species of *Oxytropis,* with a key to the identification of the various taxa.—[D.H.K.]

201. OXYTROPIS. Welsh, S.L., 1967, Legumes of Alaska, 2. Oxytropis DC., *Iowa St. J. Sci.*, **40,** 277-303. A revision of *Oxytropis* in Alaska and adjacent parts of Canada. The 13 species and 10 infraspecific taxa recognised are described and a key provided to their identification.—[D.H.K.]

204. HIPPOCREPIS. Guern, M. & Gorenflot, E., 1966, Caryologie du genre Hippocrepis L., *C. r. hebd. Séanc. Acad. Sci., Paris*, **263,** 509-512.

205. ONOBRYCHIS. Sacristán, M. D., 1966, Estudios citotaxónomicos sobre el género Onobrychis (L.) Adanson con referencia especial a la citogénetica de la esparceta (O. viciifolia Scop.), *An. Estac. exp. Aula Dei*, **8,** 1-114. The relationships between seven species of *Onobrychis* are reviewed and variations between different populations of *O. viciifolia* are investigated.—[D.H.K.]

206. VICIA. Ali, S., 1967, Revision of the genus Vicia Linn. from West Pakistan, *Bot. notiser*, **120,** 46-56. A revision of *Vicia* in West Pakistan, with descriptions, synonymy, keys to species, etc. Many species found in Britain, especially as adventives, are included in the account.—[D.H.K.]

206. VICIA. Hanelt, P. & Mettin, D., 1966, Cytosystematische Untersuchungen in der Artengruppe um Vicia sativa L., 2, *Kulturpflanze*, **14,** 137-161. Studies on the *Vicia sativa* complex. *V. pilosa* M. Bieb, $2n = 14$; *V. amphicarpa* Dorth, $2n = 14$ and *V. macrocarpa* (Moris) Bertol., $2n = 12$, are described in detail and are considered to be distinct species. *V. angustifolia* L. subsp. *angustifolia* is cited from Sussex.—[D.H.K.]

206. VICIA. Mettin, D. & Hanelt, P., 1964, Cytosytematische Untersuchungen in der Artengruppe um Vicia sativa L., *Kulturpflanze*, **12,** 163-225.

206. VICIA. Stanković, A. K., 1964, Opyt izucenija populajacij viki posevnoj (Vicia sativa L. sensu lato) po gerbarijam i nablj udennjam v prirode, *Trudȳ prikl. Bot. Genet. Selek.*, **36,** 251-265, Studies on populations of *Vicia sativa* L., *sensu lato*, based on living and herbarium material.—[D.H.K.]

206. VICIA. Stanković, A. K., 1965, Morphological, caryological and ecogeographical characteristics of Vicia cracca L. and V. tenuifolia Roth, *Sborn. Trudy Aspir. Molod. Nauch. Sotr., Vses. Inst. Rasteniev*, **6,** 151-160.

206. VICIA. Tschiersch, B., 1966, Über den Stoffwechzel des Vicianins, *Flora, ser. A*, **157,** 43-50.

206/5. VICIA TENUIFOLIA Roth. Jansen, M. T., 1967, Een weinig bekende plant, Vicia tenuifolia Roth, *Gorteria*, **3,** 156-157. *Vicia tenuifolia* has become an established adventive in the Netherlands in recent years. The species is compared with the native *V. cracca*, from which it differs in a number of marked morphological characters. It is pointed out that the flowering period of *V. tenuifolia* is very short and earlier than that of *V. cracca*, beginning about mid-May and lasting about two weeks, it then flowers profusely and forms compact masses by the time that it commences to fruit.—[D.H.K.]

206/14. VICIA SATIVA L. Blum, A., 1966, The influence of plant density on the morphological characters and seed production of common vetch (Vicia sativa), *Exper. Agric.*, **2,** 61-67.

207. LATHYRUS. Brown, A. G. & Williams, H., 1966, Interspecific incompatibility in Lathyrus, *Rep. John Innes hort. Inst.*, **1965,** 33-34.

207/10. LATHYRUS MARITIMUS (L.) Fr. Pedersen, A., 1966, Lathyrus maritimus (L.) Fries i Danmark, en deling i to underarter, *Flora Fauna Silkeborg*, **72,** 125-129. The correct name of the species known as *Lathyrus japonicus* Willd. is shown to be **L. maritimus** (L.) Fr. based on *Pisum maritimum* L. (1753). The narrow-leaved plant which is found on the coasts of western Jutland and Schleswig-Holstein, the Shetland Islands and the Skagerrak in southern Norway is described as **L. maritimus** (L.) Fr. subsp. **acutifolius** (Bab.) Pedersen, comb. nov., based on *L. maritimus* var. *acutifolius* Bab. The distributions of both subsp. *maritimus* and subsp. *acutifolius* in Denmark and elsewhere in Europe are discussed and illustrated by a map.—[D.H.K.]

207/c. CYTISUS. Holubová-Klásková, A., 1964, Bemerkungen zur Gliederung der Gattung Cytisus L. s. 1., *Acta Univ. Carol.* (*Biol.*), **1964,** Suppl., 2, 1-24.

208.→ ROSACEAE. Rouane, M.-L., 1966, Intérêt taxinomique des plantules des Rosacées, *Bull. Soc. Hist. nat. Toulouse*, **102,** 429-435. The characters of seedlings, particularly of the cotyledons, in the Rosaceae, may be useful in systematic classification, at least to the level of genera.—[E.B.B.]

211. RUBUS. Bammi, R. K. & Olmo, H. P., 1966, Cytogenetics of Rubus, 5. Natural hybridization between Rubus procerus P. J. Muell. and R. laciniatus Willd., *Evolution*, **20,** 617-633. An account of the occurrence of natural hybrids between *Rubus procerus* and *R. laciniatus* in the United States, with details of genetics and cytology of the hybrid and its parents.—[D.H.K.]

211. RUBUS. Gilli, A., 1966, Bestimmungsschlüssel österreichischer Rubus-Arten, *Verh. zool-bot. Ges. Wien*, **105/106,** 168-170. The most comprehensive treatment of Austrian species of *Rubus* is that given in Fritsch's *Exkursionflora für Österreich* (1922), where 223 species are described and keyed. The present author provides a key to a number of additional species to bring the treatment of *Rubus* in Austria up-to-date.—[D.H.K.]

211. RUBUS. Jennings, D. L., Craig, D. L. & Topham, B., 1967, The role of the male parent in the reproduction of Rubus, *Heredity*, **22,** 43-54.

211/6. RUBUS IDAEUS L. Rousi, A., 1965, Variation among populations of Rubus idaeus in Finland, *Ann. Agric. Fenn.*, **4,** 49-58.

211/9. RUBUS CAESIUS L. Gerlach, D., 1965, Befruchtung und Autogamie bei Rubus caesius, *Biol. Zbl.*, **84,** 611-633.

212. POTENTILLA. Asker, S., 1966, Effects of mutagen treatment on some apomictic Potentilla species, *Hereditas*, **55,** 249-265.

212. POTENTILLA. Asker, S., 1966, The occurrence of aberrants in some apomictic Potentilla argentea-biotypes, *Hereditas*, **56,** 54-70.

212. POTENTILLA. Borhidi, A. & Isépy, I., 1966, Statistical studies on Potentilla species, *Acta bot. hung.*, **12,** 221-239.

212. POTENTILLA. Lecompte, M., 1966, Observations sur le compartement meiotique de quelques souches de Potentilla L. du group Vernae Th. Wolf, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262,** 653-656.

212. POTENTILLA.—See 118. HELIANTHEMUM.

Notes on the Late-Quaternary occurrence of *Hippophae rhamnoides* in southern Norway.—[D.H.K.]

252/1. Hippophae rhamnoides L. Sipkes, H., 1967, Hippophaë rhamnoides L. subsp. fluviatilis Van Soest gedijt niet in de duinen, *Gorteria*, **3,** 164. The two subspecies of *Hippophae rhamnoides* are briefly described. *H. rhamnoides* L. subsp. *fluviatilis* Van Soest occurs on stream banks in the Netherlands, while subsp. *maritima* Van Soest is found on dunes.—[D.H.K.]

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254. Epilobium. Michaelis, P., 1966, The proof of cytoplasmic inheritance in Epilobium, *Nucleus*, **9,** 1-16.

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256. Oenothera. Al-Khafaji, S. D., 1966, The cytogenetics of Oenothera, *Bull. Coll. Sci. Univ. Baghdad*, **9,** 73-77.

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256. Oenothera. Rostánski, K., 1966, Die Arten der Gattung Oenothera L. in Ungarn, *Acta bot. hung.*, **12,** 337-349. A revision of *Oenothera* in Hungary, including descriptions of species and a key to their identification. Extra-European distribution of the various species is provided.—[D.H.K.]

258/1 × 3. Circaea × intermedia Ehrh. Dostál, R., 1967, Gibberellin effects on morphogenesis in Circaea intermedia, *Acta Univ. Carol.* (*Biol.*), **1966,** Suppl. 1/2, 127-128.

262. Callitriche. Pedersen, A., 1966, Callitrichaceernes udbredelse i Danmark, *Bot. tidsskr.*, **62,** 123-145. The distributions of the various species of *Callitriche* found in Denmark are outlined and illustrated by maps.—[D.H.K.]

263/1. Viscum album L. Henderson, M., 1966, Mistletoe and its hosts, *Gdnrs' Chron.*, **160** (25), 19.

263/1. Viscum album L. Howell, J. T., 1966, Viscum album in California, *Leafl. west. Bot.*, **10,** 244. Reports the occurrence of *Viscum album* in California. It is new not only to America but to the New World.—[D.H.K.]

264. Thesium. Favarger, C., 1966, Un nombre chromosomique de base, nouveau pour le genre Thesium L. (Santalaceae), *Bull. Soc. Neuchâtel. Sci. nat.*, **89,** 57-59.

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264. THESIUM.—See 326→ URTICACEAE.

266/1. CORNUS MAS L. Juhasz, G. D., 1966, Analyse der anatomischen Verhältnisse am vegetativen und reproduktiven Spross-system von Cornus mas L., *Annls. Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8**, 121-133.

267/1. CHAMAEPERICLYMENUM SUECICUM (L.) Aschers. & Graebn. Hallgrímsson, H., 1966, The dwarf cornel, Cornus suecica, in Iceland, *Flóra* (*Iceland*), **4**, 10-17.

269.→ UMBELLIFERAE. Cauwet, A. M., 1966, Révision systématique des Ombellifères de l'Herbier Oliver, *Naturalia Monspel., Sér. bot.*, **17**, 81-96. A revision of French material of the Umbelliferae in Herb. Oliver. The specimens were gathered in the late 19th century.—[D.H.K.]

269.→ UMBELLIFERAE. Corceau-Larrival, M.-T., 1966, Involucre et involucelle chez les Ombellifères, *Bull. Soc. bot. Fr.*, **112**, 255-267.

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269. HYDROCOTYLE. Cannon, J. F. M., 1967, Short Notulae: Umbelliferae: Hydrocotyle vulgaris and H. verticillata, *Feddes Rep.*, **74**, 34-35.

269/1. HYDROCOTYLE VULGARIS L. Froebe, H. A., 1967, Der Sprossaufbau von Hydrocotyle vulgaris, *Ber. dt. bot. Ges.*, **80**, 15-27. Studies in the shoot morphology of *Hydrocotyle vulgaris*.—[D.H.K.]

271/1. ASTRANTIA MAJOR L. Pawlow, M., 1966, Rozmieszczenie Astrantia major L. w Polsce, *Badan. fizjogr. Pol. zochod.*, **18**, 215-232. Studies on the distribution of *Astrantia major* in Poland.—[D.H.K.]

272. ERYNGIUM. Bounaga, D., 1963, Anatomie du genre Eryngium en Afrique du Nord, *Bull. Soc. Hist. nat. Afr. N.*, **54**, 7-8. A key based primarily on anatomical features of the stem is given for the 19 species of *Eryngium* found in North Africa. These include the species also found in Britain as well as some which have been recorded as adventives.—[D.H.K.]

277. TORILIS.—See 278. CAUCALIS.

278. CAUCALIS. Cannon, J. F. M., 1967, Short Notulae: The generic limits of Caucalis and Torilis, *Feddes Rep.*, **74**, 36-37. In preparing accounts of the species of *Caucalis* and *Torilis* for the second volume of *Flora Europaea* the author has had considerable difficulty in defining the generic limits of the two genera. A number of species frequently placed under *Caucalis* must be assigned to *Torilis*, viz. *Caucalis leptophylla*, *C. elongata* (= *Torilis arvensis* subsp. *elongata*), *C. tenella*, *C. caerulescens* (= *Torilis arvensis*) and *C. leptocarpa*.—[D.H.K.]

283/5. BUPLEURUM FALCATUM L. Fujita, S. & Kurihara, K., 1966, Germination experiments on Bupleurum falcatum, 1., *Bull. natn. Inst. hyg. Sci., Tokyo*, **84**, 152-153.

294/1. PIMPINELLA SAXIFRAGA L. Surek, J., 1967, Pimpinella saxifraga L. subsp. rupestris Weide 1962 ein neuer Neoendemit des Gebirges Krkonoše, *Preslia*, **39**, 66-71.

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295/1. AEGOPODIUM PODAGRARIA L. Ivens, G. W., 1966, A rogue's gallery of weeds: Ground Elder, *Gdnrs' Chron.*, **159** (27), 644. Notes on *Aegopodium podagraria* and various methods of controlling its spread.—[D.H.K.]

300/2. OENANTHE PIMPINELLOIDES L. Constance, L., 1966, Oenanthe pimpinelloides L. in North America, *Leafl. west. Bot.*, **10**, 326. Herbarium specimens of *Oenanthe pimpinelloides* collected in Humboldt County, California, in 1937 provide the first evidence of the occurrence of this Eurasian species as an adventive in North America. The species was again collected in the same area in 1950.—[D.H.K.]

307. ANGELICA. Tikhomirov, V. N. & Tretyakova (Galakhova), O. N., 1966, Materialy po morfologi gruppy Angelicinae, 2. Sravnitel'naja anatomija ploda vidor podroda Angelica roda Angelica L., *Bjull. Mosk. Obsc. Isp. Prir.* (*Biol.*), **72,** 43-54. Studies on the anatomy of fruits in *Angelica* subgenus *Angelica.*—[D.H.K.]

309. PEUCEDANUM. Bosçaiu, N. & Ratiu, F., 1965, Observatii sistematice si anatomice asupra unor specii de Peucedanum din sectia Peucedanum, *Contr. Bot.* (*Cluj*), **1965,** 299-312.

311. HERACLEUM. McClintock, D., 1966, Ornamental Umbellifers, *Gdnrs' Chron.*, **159** (25), 608. A letter to the editor regarding *Heracleum mantegazzianum* and *H. persicum.*—[D.H.K.]

311/1. HERACLEUM SPHONDYLIUM L. Bradley, J. M. & Fell, K. R., 1966, The anatomy of the fruit of Heracleum sphondylium L., *Planta Medica*, **14,** 10-18.

311/2. HERACLEUM MANTEGAZZIANUM Somm. & Levier. Savonius, M., 1966, Giant Parsnip, *Gdnrs' Chron.*, **160** (8), 17.

314/1. DAUCUS CAROTA L. Dale, H. M. & Harrison, P. J., 1966, Wild carrot seeds: germination and dormancy, *Weeds*, **14,** 201-204.

314/1. DAUCUS CAROTA L. Harrison, P. J. & Dale, H. M., 1966, The effect of grazing and clipping on the control of the wild carrot, *Weeds*, **14,** 285-288.

314/1. DAUCUS CAROTA L. McCollom, G. D., 1966, Occurrence of petaloid stamens in wild carrot (Daucus carota) from Sweden, *Econ. Bot.*, **20,** 361-367.

315.→ CUCURBITACEAE. Jeffrey, C., 1966, On the classification of the Cucurbitaceae, *Kew Bull.*, **20,** 417-426.

316. ASARUM.—See 326.→ URTICACEAE.

317. ARISTOLOCHIA.—See 326.→ URTICACEAE.

318.→ EUPHORBIACEAE. Kohler, E., 1965, Die Pollenmorphologie die biovulaten Euphorbiaceae und ihre Bedeutung für die Taxonomie, *Grana palynol.*, **6,** 26-120.

318.→ EUPHORBIACEAE. Ponsinet, G. & Ourissen, G., 1965, Études chimiotaxonomiques dans la famille des Euphorbiacées, 1. Introduction générale et séparation et identification des triterpènes tétracyclique monohydryxolés naturels, *Phytochemistry*, **4,** 799-811.

318. MERCURIALIS. André, F., 1966, Étude ontogénique comparée des complexes inflorescentiels axillaires de Mercurialis annua L. s. st. ($2x = 16$) et de Mercurialis ambigua L. ($6x = 48$), *Naturalia Monspel., Sér. bot.*, **17,** 3-14.

319. EUPHORBIA. Huguet, P., 1966, Euphorbes de France—Section Anisophyllum, *Bull. Cent. Étud. Rech.-Scient. Biarritz*, **6,** 227-239. Six species of this section of *Euphorbia* are found in France, four adventive and two native, one of the latter being *E. peplis*. The floral parts and capsules are described and illustrated by diagrams.—[E.B.B.]

320.→ POLYGONACEAE. Guignard, J.-L., 1967, Embryogénie des Polygonacées. Développement de l'embryon chez le Rumex aquaticus L., *Bull. Soc. bot. Fr.*, **113,** 224-226. The development of the embryo of *Rumex aquaticus* L. is linked up with the archetype of *Polygonum persicaria*, which confirms the homogeneity of the embryogenic characters of the Polygonaceae.—[Author's summary, translated by E.B.B.]

320. POLYGONUM. Lorenzonii, G. G., 1967, Note tassonomiche su Polygonum L. e Tiniaria Meisn. dell'Italia nord-orientale, *G. bot. ital.*, **73**, 150-152. A list is given of species and lower taxa of *Polygonum* found growing in north-eastern Italy.—[D.H.K.]

320/9. POLYGONUM PERSICARIA L. Hammerton, J. L., 1965, Études sur des espèces de mauvaises herbes du genre Polygonum L., 1. Variations physiologiques dans P. persicaria L., *Weed Res.*, **5**, 13-26. A study on physiological variation in *Polygonum persicaria*.—[D.H.K.]

320/10. POLYGONUM LAPATHIFOLIUM L. Hammerton, J. L. & Stone, M., 1966, Études sur des espèces de mauvaises herbes du genre Polygonum L., 2. Variations physiologiques dans P. lapathifolium L., *Weed Res.*, **6**, 104-131. Studies on physiological variation in *Polygonum lapathifolium*.—[D.H.K.]

320/15. POLYGONUM CONVOLVULUS L. Timson, J., 1966, The germination of Polygonum convolvulus L., *New Phytol.*, **65**, 423-428.

325. RUMEX. Cavers, P. B. & Harper, J. L., 1967, Studies in the dynamics of plant populations, 1. The fate of seeds and transplants introduced into various habitats *J. Ecol.*, **55**, 59-71. Seeds and transplants of *Rumex crispus*, *R. obtusifolius* and *R. crispus* var. *littoreus* were introduced into a wide variety of habitats. Seeds germinated freely in most habitats giving spring and autumn flushing of seedlings. Most of these survived only 2-3 months in closed grassland communities—but survival was up to 2 years in a woodland site. The maritime variety of *R. crispus* germinated in all sites and survived for 2 years on a shingle site. The habitat specifities of the taxa are apparently determined not so much by specialized germination requirements but by differential seedling survival. Transplants of these taxa persisted longer than seedlings but in most habitats had lost weight at the end of the experiments. The significance of seedlings of a certain age to 'resist inanitation' is discussed. The fact that habitats in which one or more of the three *Rumex* taxa were abundant did not permit further recruitment from seed or transplant suggests that the existing populations represented a relic from an earlier condition of the habitat when the environment was favourable for establishment. Alternatively, most of the habitats chosen may already have reached saturation densities of *Rumex* species. The most successful establishment from seed and phytometers was in the uncolonized habitat of new shingle.—[Authors' summary]

325. RUMEX. Cavers, P. B. & Harper, J. L., 1967, The comparative biology of closely related species living in the same area, 9. Rumex: the nature of adaption to a sea-shore habitat, *J. Ecol.*, **55**, 73-82. Studies on *Rumex obtusifolius*, *R. crispus* and *R. crispus* var. *littoreus* in the field and under laboratory conditions. Seeds of *R. crispus* var. *littoreus* floated in sea water and germinated more rapidly than the inland form in fresh water following immersion in sea water. The effects of sea water dousing on seedlings, and the flowering periods of the three taxa were investigated.—[D.H.K.]

325. RUMEX. Gambi, O. V., 1966, Influence of light and temperature on the germination of some 'Rumex' seeds. *Webbia*, **21**, 461-474. Studies on the germination of seeds of *Rumex crispus*, *R. conglomeratus* and *R. hydrolapathum* under experimental conditions.—[D.H.K.]

325. RUMEX. Rechinger, K. H., f., 1966, Beiträge zur Kenntnis von Rumex, 16. Lectotypes for certain North American taxa of Rumex, *Leafl. west. Bot.*, **10**, 332-333.

325. RUMEX. Weinert, E., 1963, Der Formenkreis von Rumex acetosella L. (Subgenus Acetosella (Meisn.) Rech. f.), *Wiss. Z. Martin-Luther-Univ. Halle-Witten.*

Math.-Nat. Reihe, **12**, 676-677. The segregates of *Rumex acetosella* L. *sensu lato* recognised in Germany are *R. angiocarpus* Murb., *R. tenuifolius* (Wallr.) Löve and *R. acetosella* L., *sensu stricto*. A number of forms of *R. acetosella* are also recognised and a key is provided to their identification.—[D.H.K.]

325/2. RUMEX ACETOSA L. Nordhagen, R., 1966, Remarks on the serpentine-sorrel, Rumex acetosa subsp. serpenticola (Rune) Nordhagen, and its distribution in Norway, *Blyttia*, **1966**, 268-294.

326.→ URTICACEAE. Pedersen, A., 1966, Cannabaceernes, Urticaceernes, Santalaceernes, Aristoliaceernes, Resedaceernes og Cistaceernes udbredelsei Danmark, *Bot. tidsskr.*, **62**, 85-122. The distributions of the species of *Humulus*, *Cannabis*, *Paretaria*, *Urtica*, *Thesium*, *Asarum*, *Aristolochia*, *Reseda* and *Helianthemum* in Denmark are outlined and illustrated by maps.—[D.H.K.]

326.→ URTICACEAE. Tarnavschi, I. T., Serbanescu-Jitariu, G., Mitroiu, N. & Radulescu, D., 1967, Zur Pollenmorphologie der Urticales aus der Flora Rumäniens, *Rev. Roum. Biol., Sér. Bot.*, **12**, 251-262. Studies on the pollen morphology of the Urticaceae and Ulmaceae. Species studied included *Ulmus glabra*, *U. stricta*, *U. procera*, *U.* × *hollandica*, *Ficus carica*, *Humulus lupulus*, *H. japonicus*, *Cannabis sativa*, *Urtica dioica*, *U. urens*, *U. pilulifera*, *U. dodartii*, *Parietaria officinalis* and *P. diffusa*.—[D.H.K.]

326. PARIETARIA. Mennema, J. & Segal, S., 1967, Het geslacht Parietaria L. in Nederland, *Gorteria*, **3**, 96-102 & 109-118. A study of herbarium specimens and of living plants of both species of *Parietaria* occurring in the Netherlands permit the following conclusions:

1. Both species cannot possibly be conspecific on account of the constant differences in the morphology of the inflorescence, in the chromosome number, and in their periodicity, ecology and distributional areas.

2. The binomial **Parietaria judaica** L., 1756 has priority over the name *P. diffusa* proposed by Mertens & Koch in 1823, and the illegitimate name *P. ramiflora* Moench, 1794.

3. The two species can be distinguished as follows:

P. officinalis L., *Sp. Pl.*, 1753, p. 1052. Syn.: *P. erecta* Mert. & Koch, 1823; *P. officinalis* L. var. *erecta* (Mert. & Koch) Weddell 1857; *P. officinalis* L. subsp. *erecta* (Mert. & Koch) Béguinot, 1908. Stem usually erect, branched or unbranched, (20 –) 50 – 70 (– 160) cm tall, 3-6 mm in diam., as a rule scantily pubescent, green or faintly erubescent, hollow; in the autumn with red hibernation buds. Leaves comparatively large, (5 –) 8 – 12 (– 20) cm long, ovate-oblong, often long-acuminate; the blades from about 3 to about 5 times as long as the petiole. Inflorescences almost invariably multiflorous, forming dense clusters of flowers. Bracts of the flowers of the cincinnate portions of the cymes free at the base. Perigone after anthesis not or hardly accrescent, 2 mm long, closed around the 1·5 mm long nutlet. Haploid chromosome number: $n = 7$.

P. judaica L., *Fl. Palaest.*, 1756, p. 466: Syn.: *P. ramiflora* Moench, 1794, nom. illegit.; *P. diffusa* Mert. & Koch, 1823; *P. officinalis* L. var. *diffusa* (Mert. & Koch) Weddell, 1857; *P. officinalis* L. var. *ramiflora* (Moench) Aschers. & Graebn., 1911; *P. officinalis* sensu Jarmolenko, 1941, non L. Stem usually ascending or prostrate, frequently ramified, (3 –) 20 – 40 (– 110) cm long, 2-3 mm in diam., usually densely pubescent, dark red, pithy; not forming hibernation buds (in springtime new shoots are produced from the rhizome). Leaves comparatively small, (1 –) 4 (– 6) cm long, ovate, often shortly acuminate; the blades from about 2 to about 3 times as long as the petiole. Inflorescences usually pauciflorous, forming small lax clusters. Bracts of the flowers of the cincinnate portions of the cymes connate at the base. Perigone manifestly accrescent after anthesis, 3 mm long, slit open; nutlet 1 mm long. Haploid chromosome number: $n = 13$.

4. It seems highly probable that a tetraploid form of *P. officinalis* or a closely allied taxon must have been one of the parent forms when the taxon *P. judaica* originated.

5. *P. judaica* exhibits a marked preference to walls as a habitat, whereas *P. officinalis* prefers growing under shrubs or in other sheltered (and often ruderal) sites.

6. Of the two, only *P. judaica* is a species of mediterranean-atlantic distribution; the principal area of distribution of *P. officinalis* lies presumably in the Danube countries of central Europe and in the Balkans.

7. *P. judaica* may be considered to be truly native in this country in the so-called Fluviatile District, but *P. officinalis* is probably an escape from cultivation.—[Author's summary]

328/2. URTICA DIOICA L. Dopper, H., 1966, Zur Stoffpnecluktivät der Grossen Brennessel (Urtica dioica L.) au einem Ruderalstandort, *Verh. bot. Ver. Prov. Brandenb.*, **103**, 54-64.

328/2. URTICA DIOICA L. Dopper, H., 1967, Monözie und Hermaphroditismus bei Urtica dioica L., *Flora, ser. A*, **157**, 97-99.

329.→ CANNABIACEAE.—See 326.→ URTICACEAE.

329. CANNABIS.—See 326.→ URTICACEAE.

329/1. HUMULUS LUPULUS L. Clos, E. C. & Germann, C. E., 1966, Bibliografia sobre 'Lupulo' ('Humulus lupulus'), *Revta Fac. Agron. Univ. nac. La Plata*, **41** (1), 15-42. A bibliography of *Humulus lupulus*.—[D.H.K.]

330. ULMUS. Richens, R. H., 1965, Studies on Ulmus, 6. Fenland Elms, *Forestry*, **38**, 225-235.

330. ULMUS. Touw, A., 1963, Voorlopig overzicht van de Nederlandse iepen, *Jaarb. nederl. dendrol. Vereen.*, **22**, 57-72. A preliminary review of the species, varieties and hybrids of *Ulmus* in the Netherlands.—[D.H.K.]

330. ULMUS.—See 326.→ URTICACEAE.

330/2. ULMUS PROCERA Salisb. Guignard, J.-L. & Mestre, J.-G., 1967, Sur le développement d'embryons à partir des antipodes chez Ulmus campestris L., *Bull. Soc. bot. Fr.*, **113**, 227-228. Young embryos may develop from antipodial cells in *Ulmus procera*, but they do not appear to survive.—[E.B.B.]

330/C. CANNABIS SATIVA L. Godwin, H., 1967, The ancient cultivation of Hemp, *Antiquity*, **41**, 42-48. The historical and archaeological evidence of the early cultivation of hemp in Asia and Europe and its spread to Britain is surveyed. The history of the cultivation of the plant in England is discussed in the light of pollen studies in East Anglia.—[D.H.K.]

334/1. PLATANUS × HYBRIDA Brot. Bolman, J., 1966, Platanenbloei, *Natura*, **63**, 33-34. A popular account of the London Plane.—[D.H.K.]

335. BETULA. Dieterich, H., 1966, Untersuchungen zum ökologischen und genetischen Birkenproblem, *Silvae Genetica*, **12**, 110-124.

335. BETULA. Knowles, E., 1967, Cultivars of British wild plants, 3. Birches, *Gdnrs' Chron.*, **161** (15), 14.

335. BETULA. Kuzmanov, B., Kožuharov, S. & Ivanona, H., 1966, Biometric studies on the genus Betula in Bulgaria, *Fragm. Flor. geobot.*, **12**, 329-336. Biometrical studies were carried out on six native populations of *Betula* in order to ascertain the variability and taxonomic status of the populations, the species occurring in Bulgaria to which these populations belonged and the relationships between Bulgarian and other European populations. The results of these studies showed that all populations exhibited the same general characters as *B. pendula*, but further work is needed to confirm that this is the only native species present in the country.—[D.H.K.]

335. Betula. Makhnev, A. K., 1965, O vzaimootnošenii berezy borodavcatoj i pušitoj i proizvoditel'nosti ikh otdel'nykh form v svjazi s fenologicenskimi osobennostjami, *Lês. Zh. Arkhangel'sk*, **1965** (3), 29-33. Studies on the interrelationship between *Betula pendula* and *B. pubescens*, and the productivity of their individual forms in relation to phenological features.—[D.H.K.]

335. Betula. Tabata, H., 1966, A contribution to the biology of Japanese birches, *Mem. Nat. Coll. Sci. Univ. Kyoto, Ser. B*, **32,** 239-271.

335/1. Betula pendula Roth. Popnikola, L., 1966, Division of the common birch (Betula verrucosa) into lower taxonomic classes, *Sumarstvo*, **19,** 35-44.

335/3. Betula nana L. Souchon, C., 1967, Étude biogéographique d'une espèce boreo-arctique (Betula nana L.) en un point limite de son aire, *C. r. somm. Séances Soc. Biogéogr.*, **377-379,** 121-127.

336. Alnus. Murai, S., 1964, Phytotaxonomical and geobotanical studies on genus Alnus in Japan, 3. Taxonomy of whole world species and distribution of each section, *Bull. For. Exp. Stn. Meguro, Tokyo*, **171,** 1-107.

337/1. Carpinus betulus L.—See 338/1. Corylus avellana L.

338/1. Corylus avellana L. Edlin, H. L., 1966, A modern sylva, or a discourse of forest trees, 19. Hazel, Corylus avellana L. and Hornbeam, Carpinus betulus L., *Q. Jl. For.*, **40,** 282-289.

339. Fagus. Borza, A., 1965, Le genre Fagus dans la République Populaire Roumaine, *Biológia Bratisl.*, **20,** 367-373.

339/1. Fagus sylvatica L. Lancaster, C. R., 1966, A new beech cultivar, *Gdnrs' Chron.*, **160** (17), 13. A note on *Fagus sylvatica* 'Rotundifolia' which is apparently native in England.—[D.H.K.]

340/1. Castanea sativa L. Edlin, H. L., 1966, A modern sylva, or a discourse of forest trees, 18. Sweet Chestnut, Castanea sativa L., Walnut, Juglans regia L. and Mulberry, Morus nigra L., *Q. Jl. For.*, **60,** 193-201.

341. Quercus. Georgescu, C. C. & Ciobanu, I. R., 1965, Materiele de Quercus din ierbarul institutului de sistematica si geobotanica al Universitatii din Budapesta, *Stud. Cerc. Biol. Bot. (Bucuresti)*, **17,** 237-253.

341. Quercus. Georgescu, C. C. & Ciobanu, I. T., 1965, Consideratii geograficoecologice asupra specilor de Quercus din seriile Lanuginosae Simk. si Sessiliflorae Locaj. din R.P.R., *Stud. Cerc. Biol. Bot. (Bucuresti)*, **17,** 15-22.

341/2. Quercus ilex L. Vernet, J.-L., 1966, Le colonies de chênes verts (Quercus ilex L.) au nord de la région Mediterranéenne dans le bassin supérieur du Tarn: étude floristique, *Naturalia Monspel., sér. bot.*, **17,** 223-251. A floristic study of *Quercus ilex* populations in the upper catchment of the Tarn river, southern France. The importance of the very variable climatic conditions are stressed and the floristic elements analysed. The central European element is dominant but some Mediterranean species occur at their northern limit, e.g. *Quercus coccifera* L., *Brachypodium ramosum* Roem. & Schult. and *Juniperus oxycedrus* L. The distribution of *Q. ilex* suggests that the colonies are relict though migrations from the Mediterranean may still be occurring at the present time.—[D.H.K.]

341/b. Quercus borealis Michx. f. Faber, P. J., 1966, De groei van de Amerikaanse eik in Nederland, *Ned. Bosbouw. Tijdschr.*, **38,** 357-374. Studies in the growth of the American Red Oak, *Quercus borealis*, in the Netherlands.—[D.H.K.]

342. Populus. Darter, C. E., 1966, Grey and White Poplars, *Gdnrs' Chron.*, **160** (15), 17. Notes on the distribution of male and female trees of *Populus canescens* and *P. alba* in Britain.—[D.H.K.]

343. Salix. Morozov, I. R., 1966, *Opredeliteĺ iv SSSR; ih kultura*. Pp. 245. Mockba. A key to the willows of the U.S.S.R. arranged in regions:—European Russia 40

species: Caucasus 26 species; Central Asia 43 species; West Siberia 51 species; East Siberia 71 species and the Soviet Far East 67 species. Descriptions of the various species are provided.—[D.H.K.]

343. SALIX. Skvortsov, A., 1966, O Salix purpurea L. i rodstvennykh vidakh, *Nov. Sist. Vyss. Rast. (Leningrad)*, **1966**, 48-66. Notes on *Salix purpurea* and allied species.—[D.H.K.]

343. SALIX. Tempa, K. & Bründl, L., 1964, *A füz* (*The Willow*). Pp. 251. Budapest.

344.→ ERICACEAE. Watson, L., Williams, W. T. and Lance, G. N., 1966, A mixed data numerical approach to angiosperm taxonomy: the classification of Ericales, *Proc. Linn. Soc.*, **178**, 25-35.

344/2. LEDUM GROENLANDICUM Oeder. Koningen, H. C., 1967, Ledum groenlandicum Gunn. in Nederland, *Gorteria*, **3**, 160-161. *Ledum groenlandicum*, a species that is sometimes cultivated in gardens in the Netherlands was found in marsh vegetation of the Amstelveense Poel, a pool near Amstelveen, prov. N. Holland.—[Author's summary]

354/1. ARCTOSTAPHYLOS UVA-URSI (L.) Nied. Gawlowska, J., 1965, Badania nad morfologia i biologia macznicy lekarskiez. Arctostaphylos uva-ursi L. oraz sposobanie joj ochrony, *Och. Przyr.*, **31**, 7-51. Studies on the morphology and biology of *Arctostaphylos uva-ursi*.—[D.H.K.]

354/1. ARCTOSTAPHYLOS UVA-URSI (L.) Nied. Moravec, J., 1967, Arctostaphylos uva-ursi (L.) Spr.—medvedice lécivá v údolíatavy a stredni Vltavy a jejrozširení v Cechách, *Preslia*, **39**, 167-177. A phytogeographical account of *Arctostaphylos uva-ursi* in Bohemia.—[D.H.K.]

354/1. ARCTOSTAPHYLOS UVA-URSI (L.) Nied. Werdyn, L., 1964, Materialy do rozmiesycyenia Arctostaphylos uva-ursi L. na vrizu Polskim, *Badan. fizjogr. Pol. zachod.*, **14**, 127-143. Notes on the distribution of *Arctostaphylos uva-ursi* in the Polish lowlands.—[D.H.K.]

356/1. CALLUNA VULGARIS (L.) Hull. Bellamy, D. J. & Holland, P. J., 1966, Determination of the net annual aerial production of Calluna vulgaris (L.) Hull, in northern England, *Oikos*, **17**, 272-275.

356/1. CALLUNA VULGARIS (L.) Hull. McClintock, D., 1967, White heathers and their allies, *Jl. R. hort. Soc.*, **92**, 347-353.

356/1. CALLUNA VULGARIS (L.) Hull. Watson, A., Miller, G. R. & Green, F. H.W., 1966, Winter browning of heather (Calluna vulgaris) and other moorland plants, *Trans. Proc. bot. Soc. Edinb.*, **40**, 195-203.

356/1. CALLUNA VULGARIS (L.) Hull.—See 357. ERICA.

357. ERICA. McClintock, D., 1964-66, Notes on British Heaths, 1. Species of heather in Britain, *Heather Soc. Yb.*, **1964**, 4-9: 2. Hybrids in Britain, *loc. cit.*, **1965**, 9-17: 3. Variation, *loc. cit.*, **1966**, 32-43.

357. ERICA. McClintock, D., 1966, Double-flowered hardy Heathers, *Jl. R. hort. Soc.*, **91**, 438-443.

357. ERICA. Ross, R., 1967, On some Linnaean species of Erica, *J. Linn. Soc., Bot.*, **60**, 61-73. The characters that distinguish the two species of *Erica* sect. *Callicodon* Benth. are discussed and it is shown that they can be distinguished by the degree to which the anthers are exserted, by the habit, and by the degree of development of infrafoliar ridges on the young twigs, and that they have separate areas of distribution, one in southern continental Europe, the other in the Iberian peninsula, western France and western Ireland. The nomenclature of the two species is also considered and it is shown that the correct name for the former species is **E. herbacea** L., not *E. carnea* L., and the correct name for the latter species is **E. hibernica** (Hook. & Arn.) Syme, not *E. mediterranea* L. It is also

shown that the name *E. viridi-purpurea* L. cannot be applied to a South African heather and that the correct name for the species so called is *E. mauritanica* L.—[Author's summary]

357. Erica.—See 356. Calluna.

357/1. Erica tetralix L. Barkman, J. J., 1967, Een merkwaardige monstruositeit bij Erica tetralix L., *Gorteria*, **3**, 102-104. A description is given of an anomalous form of *Erica tetralix* with normal and teratological flowers on the same plant. The latter lack stamina, but have a normal pistillum; the corolla consists of four small, green choripetalous leaves without glandular hairs.—[Author's summary]

357/1. Erica tetralix L. Mäkinen, Y. & Tiikkainen, J., 1966, Erica tetralix in Finland, *Annls. Bot. Fenn.*, **3**, 410-417. *Erica tetralix* has been recorded from Finland on three occasions: in 1865, 1905 and 1936. These records were not subsequently confirmed. The species was discovered in the country in 1964. Details of the locality and associated species are provided, and the extra-European distribution of the plant is reviewed.—[D.H.K.]

357/4. Erica cinerea L. Serra, L., 1966, Ricerche geobotaniche su 'Erica cinerea' in Italia, *Webbia*, **21**, 801-837. An account of the distribution of *Erica cinerea* in Liguria. Comparisons are made between Italian populations and populations in other parts of Europe.—[D.H.K.]

358. Vaccinium. Flössner, W., 1962, Vaccinium oxycoccus L. ssp. microcarpum (Turcz.) Blytt et Dahl im Erzgebirge, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **11**, 199-200.

358. Vaccinium. Löve, D. & Boscaiu, N., 1966, Vaccinium gaultherioides Bigel. an Arctic-Alpine species, *Rev. Roum. Biol., Sér. Bot.*, **11**, 295-305. As a consequence of the identification of the species *Vaccinium gaultherioides* Bigel. in the mountains of central Europe, where it was previously considered only as an infraspecific taxon of the *Vaccinium uliginosum* L. complex, the authors outline a series of taxonomical, phytogeographical, and coenological facts. Both the morphological and cytological features as well as the biometrical studies allow a conclusive separation of *V. gaultherioides* from *V. uliginosum*. The present apparently circumpolar area of *V. gaultherioides* with its numerous and very disjunct alpine outposts indicates that this diploid species ($2n = 24$) belongs to an arctic tertiary taxon from which derived, probably by hemiautopolyploidy the tetraploid ($2n = 48$) species *V. uliginosum*.—[Authors' summary]

359.→ Pyrolaceae. Nowicke, J. W., 1966, Pollen morphology and classification of the Pyrolaceae and Monotropaceae, *Ann. Mo. bot. Gdn.*, **53**, 213-219.

359. Pyrola. Krisa, B., 1966, Contribution to the taxonomy of the genus Pyrola L. in North America, *Bot. Jb.*, **85**, 612-637. A revision of *Pyrola* ser. *Asarifolia* in North America.—[D.H.K.]

359. Pyrola. Nutt, R. D., 1965, Our native wintergreens, *Q. Bull. alp. Gdn. Soc.*, **33**, 13-14.

359/3. Pyrola rotundifolia L. Side, Mrs A. G., 1967, Pyrola rotundifolia in the London Area of Kent, *Lond. Nat.*, **46**, 24-25. Notes on *Pyrola rotundifolia* in a chalkpit near Dartford. Lists of associated species are given.—[D.H.K.]

360. Orthilia.—See 359. Pyrola.

362.→ Monotropaceae.—See 359.→ Pyrolaceae.

362/2(2). Monotropa Hypophegea Wallr. McMullen, R., 1967, Monotropa in Dublin area, *Ir. Nat. J.*, **15**, 307. Reports the discovery of *Monotropa hypophegea* in Co. Dublin.—[D.H.K.]

364/2. Empetrum hermaphroditum Hagerup. Provost, M., 1967, Sur la présence de l'Empetrum hermaphroditum Hagerup aux Pyrenées françaises, *Monde des Plantes*, **354**, 11.

365. LIMONIUM. Boorman, L. A., 1967, Limonium vulgare Mill. and L. humile L. (Biological Flora), *J. Ecol.*, **55**, 221-232.

366. ARMERIA. Gorenflot, R., 1966, Introduction à une étude biosystématique du genre Armeria Willd., *C. r. hebd. Séanc. Acad Sci., Paris*, **262**, 1714-1717.

367.→ PRIMULACEAE. Knowles, E., 1967, Cultivars of British wild plants, 5. The Primrose family, *Gdnrs' Chron.*, **161** (17), 12. The cultivars of *Primula vulgaris P. veris*, *P. elatior*, *Lysimachia* species, *Anagallis arvensis* and *A. tenella* are described.—[D.H.K.]

367. PRIMULA. Silverside, A., 1965, Oxlip hybrids in North Essex, *Country-side*, **20**, 205.

367. PRIMULA. Valentine, D. H., 1966, The experimental taxonomy of some Primula species, *Trans. Proc. bot. Soc. Edinb.*, **40**, 169-180.

367/4. PRIMULA ELATIOR (L.) Hill. Kerr, A. J., 1967, A new oxlip locality in Cambridgeshire, *Nature Cambs.*, **10**, 26-27.

374/P. PHLOX. Smith, D. M. & Levin, D. A., 1967, Karyotypes of eastern North American Phlox, *Am. J. Bot.*, **54**, 324-334. A few species which occur as garden escapes in Britain are included in this account of *Phlox* in eastern North America. —[D.H.K.]

375/1. BUDDLEJA DAVIDII Franch. Kent, D. H., 1967, Buddleia, The Butterfly Bush, *Wildlife and the Countryside*, **266**, 9-10. A short popular account of the introduction of *Buddleja davidii* into cultivation and its subsequent spread into natural and artificial habitats.—[D.H.K.]

376. FRAXINUS. Georgescu, C. C. & Tutunaru, V., 1967, Taxonomische und ökologische Betrachtungen über die in Rumänien vertretenen Fraxinus-Arten (Sectio Bumelioides (Endl.) V. Vassil.) unter besonderer Berücksichtigung der Systematik von Fraxinus pallisae Wilm., *Rev. Roum. Biol., Sér. Bot.*, **12**, 149-158. Studies on Romanian *Fraxinus* species, including *F. excelsior*.—[D.H.K.]

376/1. FRAXINUS EXCELSIOR L. Knowles, E., 1967, Cultivars of British wild plants, 13. Ash and Privet, *Gdnrs' Chron.*, **161** (26), 10. The various cultivars of *Fraxinus excelsior* and *Ligustrum vulgare* are briefly described.—[D.H.K.]

378/1. LIGUSTRUM VULGARE L. Browicz, K. & Hrynkiewicz-Sudnik, J., 1965, Ligustr pospolity (Ligustrum vulgare L.) w Polsce, *Arboretum kórn. Roczn.*, **10**, 5-26. An account of *Ligustrum vulgare* in Poland.—[D.H.K.]

378/1. LIGUSTRUM VULGARE L.—See 376/1. FRAXINUS EXCELSIOR L.

379. VINCA. Boivin, B., 1966, Les Apocynacées du Canada, *Naturaliste Can.*, **93**, 107-128. Both *Vinca minor* and *V. major* occur in Canada as naturalised garden escapes. The former is fairly widespread, while the latter is known only from the south-west parts of British Columbia.—[D.H.K.]

380.→ GENTIANACEAE. Nilsson, S., 1967, Notes on pollen morphological variation in Gentianaceae.—Gentianiae, *Pollen et Spores*, **9**, 49-58.

380.→ GENTIANACEAE. Nilsson, S., 1967, Pollen morphological studies in the Gentianaceae—Gentianeae, *Grana palynol.*, **7**, 46-145.

382. CENTAURIUM. Khoshoo, T. N. & Khushu, C. L., 1966, Biosystematics of Indian plants, 2. The problem of the Centaurium pulchellum complex, *Proc. Indian Acad. Sci., sect. B*, **63**, 152-160.

382. CENTAURIUM.—See 383. BLACKSTONIA.

382/6. CENTAURIUM LITTORALE (D. Turner) Gilmour. Freijsen, A. H. J., 1964, Remarks on the halophyte Centaurium littorale, *Proc. K. ned. Akad. Wet., ser. C*, **67**, 208-217.

382/6. Centaurium littorale (D. Turner) Gilmour. Freijsen, A. H. J., 1967, Some observations on the transition zone between the xerosere and the halosere on the Boschplaat (Terschelling, The Netherlands), with special attention to Centaurium vulgare Rafn., *Acta bot. neerl.*, **15**, 668-682. Phytosociological studies on salt marshes on the west Friesian island of Terschelling with particular emphasis on the distribution pattern and life cycle of *Centaurium littorale*.—[D.H.K.]

383. Blackstonia. Zeltner, L., 1966, Sur quelques taxa nouveau ou méconnus des genres Blackstonia Huds. et Centaurium Hill, *Bull. Soc. Neuchâtel. Sci. nat.*, **89**, 61-74. Cytological studies on *Blackstonia* and *Centaurium*. In *Blackstonia perfoliata* and *B. serotina*, diploid races (n = 10) occur in Greece, and probably also in Portugal. Tetraploid races have been found in central Europe and the Mediterranean region. These chromosome races will probably be treated as subspecies or varieties when further studies have been made on their ecology and geographical distributions.—[E.B.B. & D.H.K.]

383/1. Blackstonia perfoliata (L.) Huds. Sipkes, C., 1966, De Winterbitterling (Blackstonia perfoliata ssp. serotina), *Levende Nat.*, **69**, 106-110.

384. Gentiana. Knowles, E., 1967, Cultivars of British wild plants, 18. Gentians Jacob's Ladder, Pinks . . . , *Gdnrs' Chron.*, **162** (5), 14. The British species of *Gentiana* in cultivation are *G. verna* and *G. pneumonanthe*. Other plants referred to in this account are *Nymphoides peltata*, *Polemonium caeruleum*, *Dianthus deltoides*, *D. gratianopolitanus*, *Saponaria officinalis*, *Silene acaulis*, *S. vulgaris*, fl. pleno, *S. dioica*, *S. alba* forma 'multiplex' (flore pleno), *Lychnis flos-cuculi L. viscaria*, *L. alpina*, *Minuartia verna* and *Sagina saginoides*.—[D.H.K.]

384. Gentiana. Pringle, J. S., 1967, Taxonomy of Gentiana, Section Pneumonanthe in eastern North America, *Brittonia*, **19**, 1-32. A revision of *Gentiana* Section *Pneumonanthe* in eastern North America, with descriptions, synonymy and keys to the identification of species and varieties.—[D.H.K.]

384/2. Gentiana verna L. Lamb, J. G. D., 1967, Soil preferences of Gentiana verna, *Gdnrs' Chron.*, **162** (4), 7.

387/1. Nymphoides peltata (S. G. Gmel.) Kuntze.—See 384. Gentiana.

388. Polemonium. Stuchlik, L., 1967, Pollen morphology in the Polemoniaceae, *Grana palynol.*, **7**, 146-240.

388/1. Polemonium caeruleum L.—See 384. Gentiana.

390. Omphalodes. Grau, J., 1967, Primäre und sekundäre Chromosomenbasiszahlen bei Omphalodes, *Öst. bot. Z.*, **114**, 66-72. Cytological studies on *Omphalodes*. *O. verna* from Italy and Jugoslavia had $2n$ = 48.—[D.H.K.]

392/1. Symphytum officinale L. Diomainto-Bonnand, J., 1966, L'inflorescence du symphytum officinale: évolution des méristèmes axillaires et devinir du méristeine apical, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262**, 638-641.

392/1. Symphytum officinale L. Diomainto-Bonnand, J., 1966, La cyme bipare du Symphytum officinale: étude de l'initiation et du développement des premiers bourgeous. Passage à la cyme unipare, *C. r. hebd. Séanc. Acad. Sci., Paris*, **262,** 1081-1083.

400. Myosotis. Blaise, S., 1965, Observation sur la caryosystématique et l'écologie de Myosotis sylvatica (Ehrh.) Hoffm. sensu latissimo, *C. r. hebd. Séanc. Acad. Sci., Paris*, **260**, 647-650. A study on the cytology and ecology of the *Myosotis sylvatica* complex. A number of new chromosome numbers are given.—[D.H.K.]

400. Myosotis. Schuster, R., 1967, Taxonomische Untersuchungen über die Serie Palustres M. Pop der Gattung Myosotis L., *Feddes Rep.*, **74**, 39-98. A revision of *Myosotis* series *Palustres*, with full descriptions, synonymy, keys to the identification of the various species, distribution maps and data on cytology,

morphology and ecology. The author recognises 13 species in this polymorphic group:—*M. palustris* (L.) Nathh., *Fl. Monspel.* (1756), which predates *M. scopioides* L. emend. Hill, *Veg. Syst.* (1764), based on *M. scorpioides* var. *palustris* L., *Sp. Pl.*, 131 (1753); this has two subspecies—subsp. *palustris*, widespread throughout Europe, etc., and subsp. *radicans* (Opiz) R. Schuster, comb. nov., found in central Europe: *M. nemorosa* Bess. (*M. strigulosa* Reichb., *M. palustris* With. var. *strigulosa* Mert. & Koch), widespread in mid, east and south-east Europe, this has two subspecies—subsp. *brevisetacea* R. Schuster, subsp. nov., scattered throughout Europe, and subsp. *orbelica* (Vel.) R. Schuster, comb. nov., found in Bulgaria: *M. laxiflora* Reichb. (*M. palustris* With. var. *laxiflora* (Reichb.) DC.), widespread in Europe: *M. praecox* Hulphers, confined to Scandinavia: *M. rehsteineri* Wartmann, found in mid Europe: *M. caespitosa* C. V. Schultz, widespread in Europe, one of its varieties—var. **neglecta** R. Schuster, var. nov., is cited for Surrey, it differs from var. *caespitosa* in its denser inflorescence and shorter peduncles, as well as in the shape of the calyx teeth: *M. laxa* Lehmann, found on the Atlantic coasts of North America and Scandinavia: *M. lusitanica* R. Schuster, sp. nov., described from Portugal: *M. sicula* Guss., which has two subspecies—subsp. *sicula* and subsp. *virgata* (Beg.) R. Schuster, comb. nov.:*M. stolonifera* J. Gay, from the Iberian peninsula, etc., this has two subspecies—subsp. *stolonifera*, under which is placed *M. brevifolia* C. E. Salmon and subsp. *hirsuta* R. Schuster, subsp. nov., described from Spain: *M. repens* G. Don, widespread in Europe: *M. welwitschii* Boiss. & Reut., found in Portugal and *M. azorica* H. C. Wats. from the Azores.

Many varieties are included in the account and the occurrence of hybrids in the group is discussed.—[D.H.K.]

402/1. MERTENSIA MARITIMA (L.) Gray. Bullard, E. R., 1965, Mertensia maritima in Orkney, *Gdnrs' Chron.*, **158** (22), 523.

403. ECHIUM. Klotz, G., 1962, Zur Systematik und Nomenklatur eineger Echium-Arten, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **11,** 293-302, 703-711 & 1087-1104.

403. ECHIUM. Klotz, G., 1963, Die Echium-Arten der CSSR, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12,** 137-142. A revision of the species of *Echium* found in Czechoslovakia, with descriptions, synonymy and keys to the identification of the various species.—[D.H.K.]

403/A. AMSINCKIA. Welsh, N. S., 1965, Amsinckia, a noxious weed of increasing importance, *J. Agric. Vict. Dep. Agric.*, **63,** 383-386.

403/H. HELIOTROPIUM. Riedl, H., 1966, Die Gattung Heliotropium in Europa, *Annln. naturh. Mus. Wien*, **69,** 81-93. A revision of *Heliotropium* in Europe. Seven species are recognised among which *H. halacsyi* Riedl, sp. nov., from Greece is described as new. The species are described and a key is provided to their identification. The most important diagnostic character for separating species of *Heliotropium* is the form of the style. The geographical range and extra-European distribution of the species is also given.—[D.H.K.]

405. CONVOLVULUS. Karamanoglu, K., 1964, The species of Convolvulus in Turkey, *Communs. Fac. Sci. Univ. Ankara* (*Sci. Nat.*), **9,** 225-251.

405/1. CONVOLVULUS ARVENSIS L. Kolev, I., 1966, Za njakoi osobenosti v sistematikata i biologijata na poviticata, *Rast. Nauki* (*Sofia*), **2,** 37-48. Notes on the classification and biology of *Convolvulus arvensis*.—([D.H.K.]

406. CALYSTEGIA. Bangerter, E. B., 1967, A survey of Calystegia in the London Area: Fifth and final Report, *Lond. Nat.*, **46,** 15-23. The final report of a statistical survey of *Calystegia* populations carried out in the London Area between 1962 and 1966. Four measurements (in mm), viz. the length of the corolla, the diameter of the bracteoles from mid-rib to mid-rib, the diameter (*in vivo*) from side to side

and the width of the larger bracteole when flattened out, were made on six flowers from each population examined. No attempt at identification was invited but the colour of the flowers—white, white with pink veins, or pink was recorded. A total of 1,237 record cards were amassed, which suggests that well over 1,000 populations, at least, were examined, this is assuming that some cards were referable to the same population.

Of the 1,237 record cards, 892 were of white-flowered plants and 345 of pink-veined; only five of the latter fell into the category of *C. sepium*. The tabulation showed that 471 cards were referable to *C. sepium*, 730 to *C. silvatica* and 36 to *C.* × *lucana*. Maps illustrate the total recordings from the area, the recordings of *C. sepium*, *C. silvatica* and *C.* × *lucana*. these reveal that *C. sepium* is the more frequent species in the outer part of the area, while *C. silvatica* is more plentiful in Inner London. *C. pulchra* proved to be uncommon and only 14 certain records were confirmed, but potential hybrids between *C. pulchra* and *C. silvatica* may have been, though it is thought rarely, included in the survey as pink-veined *C. silvatica*. A table shows the habitat preferences of *C. sepium*, *C. silvatica* and *C.* × *lucana*, and an appendix lists the associated species recorded with them. Finally the results of this survey are compared with earlier work carried out by Stace in the Tunbridge Wells area.—[D.H.K.]

407. Cuscuta. Gimesi, A., 1966, Dodder eradication with 'Reglone', *Outl. Agric.*, **5,** 28-34.

407/c. Cuscuta campestris Yuncker. Dawson, J. H., 1966, Prolonged emergence of Field Dodder, *Weeds*, **13,** 373-384.

411/1. Hyoscyamus niger L. Dancs, B., 1966, Beiträge zur Kenntnis von Hyoscyamus niger L., *Annls. Univ. scient. bpest. Rolando Eötvös* (*Biol.*)., **8,** 47-61. Genetical and morphological studies on biotypes of *Hyoscyamus niger* in Hungary. —[D.H.K.]

411/1. Hyoscyamus niger L. Seidlová, F., Krekule, J. & Teltscherová, L., 1967, Inhibition of flowering in Hyoscyamus niger by 6-Azauracil without suppression of stem growth, *Nature*, **214,** 1146-1147.

412. Physalis. Waterfall, U. T., 1967, Physalis in Mexico, Central America and the West Indies, *Rhodora*, **69,** 82-120 & 203-239. A revision of *Physalis* in Mexico, Central America and the West Indies with descriptions, synonymy, keys, etc. Most of the species which occur as adventives in Britain are included in the account.—[D.H.K.]

413. Solanum. Heiser, C. B., Soria, J. & Burton, D. L., 1965, A numerical taxonomic study of Solanum species and hybrids, *Am. Nat.*, **99,** 471-488.

413. Solanum. Saarisola-Taubert, A., 1967, Adventive Solanum species of the group Morella in eastern Fennoscandia, *Annls. Bot. Fenn.*, **4,** 87-94. A revision of the *Solanum* species of the group *Morella* found in eastern Fennoscandia based on an examination of herbarium material. Only *S. nigrum* subsp. *nigrum* ($2n = 72$) occurs as an established alien, its var. *atriplicifolium* (Desp.) G. Mey., with regularly toothed leaves, and f. *pallidum* Wessely, with yellowish-green fruits also occur. The following have occurred as casual adventives—*S. nigrum* subsp. *schultesii* (Opiz) Wessely, a south European plant, which differs from subsp. *nigrum* in having spreading pubescence and glandular hairs (the hairs of subsp. *nigrum* are appressed and glandular hairs are lacking). *S. luteum* Mill., easily confused with *S. nigrum* subsp. *schultesii* but distinguished by the shape of its fruiting calyx, in which the sinuses of the calyx-lobes are roundish, not acute. *S. alatum* Moench, distinguished from *S. nigrum* by its red berries and the shape of its calyx, and from *S. luteum* by the absence of glandular hairs. *S. nitidibaccatum* Bitter, which is shown to be distinct from *S. sarachoides* Sendtn., with which it has often been regarded as conspecific. The taxonomy and nomenclature of the latter two species are discussed at length.—[D.H.K.]

413/3. Solanum nigrum L. Taudon, S. L. & Rao, G. R., 1966, Biosystematics and origin of the Indian tetraploid Solanum nigrum L., *Curr. Sci.*, **35,** 524-525.

413/5. Solanum triflorum Nutt. Van Ooststroom, S. J., 1966, Een nieuwe variëteit van Solanum triflorum Nutt., *Gorteria*, **3,** 90-91. A note on a new variety of *Solanum triflorum* Nutt., viz. var. **dentatum** Ooststr., found in 1938 near Njimegen, prov. Gelderland, Netherlands. Sandwith (1933, *Rep. botl. Soc. Exch. Club Br. Isl.*, **10,** 346) mentions a plant from Bristol, which is identical with the new variety.—[D.H.K.]

413/n. Solanum nitidibaccatum Bitter. Hilbig, W., 1966, Solanum nitidibaccatum als Weinbergsunkraut, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **15,** 779-781.

413/n. Solanum nitidibaccatum Bitter. Militzer, M., 1964, Solanum nitidibaccatum Bitter der Argentinische Nachtschatten, Irrgast und Neubürger, *Wiss. Z. Martin-Luther Univ. Halle-Witten. Math.-Nat. Reihe*, **13,** 663-664. The occurrence of the central American species *Solanum nitidibaccatum* as an adventive in Germany is recorded and discussed.—[D.H.K.]

416.→ Scrophulariaceae. Knowles, E., 1967, Cultivars of British wild plants, 11. Foxglove, Speedwell, Mullein and Toadflax, *Gdnrs' Chron.*, **161** (24), 14. Members of the Scrophulariaceae in cultivation include many cultivars of *Digitalis purpurea* and *Veronica spicata*. Other British plants grown in gardens are *Verbascum nigrum*, *Scrophularia aquatica* with cream and green variegated leaves, and *Linaria vulgaris*.—[D.H.K.]

416.→ Scrophulariaceae. Ross-Craig, S., 1966, *Drawings of British Plants*, 22. *Scrophulariaceae* (1), 39 plates. G. Bell & Sons, London: *Scrophulariaceae* (2), *Orobanchaceae*, *Lentibulariaceae*, *Verbenaceae*, 38 plates. G. Bell & Sons, London.

416.→ Scrophulariaceae. Thieret, J. W., 1967, Supraspecific classification in the Scrophulariaceae: A review, *Sida*, **3,** 87-106. A review of the various classifications of the Scrophulariaceae, a family of some 250 genera and about 5,000 species.—[D.H.K.]

418. Antirrhinum. Stubbe, H., 1966, *Genetik und Zytologie von Antirrhinum L. Sect. Antirrhinum.* Pp. 421, with 196 drawings in the text. Gustav Fischer Verlag. Jena. A detailed account of the genetics and cytology of *Antirrhinum* Section *Antirrhinum*, with particular emphasis on *A. majus*. Mutations of the latter are treated at length.—[D.H.K.]

422. Kickxia. Eberle, G., 1965, Tännelkraut (Kickxia), *Natur und Museum*, **95,** 399-402. A short account of *Kickxia spuria* and *K. elatine* in Germany, including details of associated species.—[D.H.K.]

424/5. Scrophularia vernalis L. Clemencet, M., 1967, Sur la présence de Scrofularia vernalis à Fontainebleau, *Bull. Assoc. Nat. Vall. Loing*, **43,** 59. A short note on the occurrence of *Scrophularia vernalis* at Fontainebleau. The species had not previously been recorded from the area.—[E.B.B.]

426. Limosella. Salisbury, E. J., 1967, The reproduction and germination of Limosella aquatica, *Ann. Bot.*, **31,** 147-162. Quantative data are furnished respecting the seed production and germination of *Limosella aquatica*, which is shown to have a large reproduction potential like other species of intermittently available habitats despite its small assimilatory surface. A tentative estimate of the seed output of the rarer diploid species *L. subulata* suggests that this may be only about one-sixth that of the tetraploid *L. aquatica*. Features described indicate specialization primarily to dispersal by water, and submerged capsules readily dehisce. Germination which may occur within three days is shown to be quasi-simultaneous in bright light under which over 90% may be attained but a very small percentage were found able to germinate in dim light. Experimental evidence

is provided that indicates the presence of an inhibitor in seeds the amount of which may, it is suggested, vary from seed to seed in a normal manner. As with other 'mud species' the seedling develops a zone of supporting 'prop hairs' around the base of the radicle.

The markedly intermittent occurrence of the species is attributable mainly to the irregular incidence of the requisite environmental conditions.—[Author's summary]

427/1. SIBTHORPIA EUROPAEA L. Lensk, I., 1966, Chromosomenzahlen in der Gattung Sibthorpia (Scrophulariaceae), *Naturwissenschaften*, **53**, 710-711.

428/1. ERINUS ALPINUS L. Crafter, W., *et al.*, 1966, Erinus alpinus in the wild, *Nth. Gdnr.*, **20**, 130-132. Nine letters to the editor regarding the occurrence of *Erinus alpinus* as a naturalised British species.—[D.H.K.]

428/1. ERINUS ALPINUS L. Jury, D. W., Rob, C. M., Rae, A. G., 1966, *Nth. Gdnr.*, **20**, 204-205. Further letters to the editor regarding *Erinus alpinus* as a British plant —[D.H.K.]

429. DIGITALIS. Werner, K., 1964, Die Verbreitung der Digitalis-Arten, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **13**, 453-486.

430. VERONICA. Khoshoo, T. W. & Khushu, G. L., 1966, Biosystematics of Indian plants, 3. Veronica anagallis complex, *Proc. Indian Acad. Sci.* (*Biol.*), **63**, 251-257.

430. VERONICA.—See 475/3. CAMPANULA RAPUNCULOIDES L.

430/13. VERONICA SERPYLLIFOLIA L. Arekal, G. D., 1966, Embryology of Veronica serpyllifolia L., *Proc. Indian Acad. Sci.* (*Biol.*), **64**, 241-257.

430/24. VERONICA FILIFORMIS Sm. Ivens, W., 1966, A rogues gallery of garden weeds: slender speedwell, *Gdnrs' Chron.*, **160** (8), 12. Advice is given on chemical treatments for controlling *Veronica filiformis* when it occurs as a pest of lawns and other turf.—[D.H.K.]

430/24. VERONICA FILIFORMIS Sm. Jehlik, N. & Slavik, B., 1967, Doplňky k rozširení Veronica filiformis Smith v Ceskoslovensku, *Preslia*, **39**, 206-208. Details are given of 74 new localities for *Veronica filiformis* in Bohemia, 3 in Moravia and 2 in Slovakia. The species is now known in at least 135 different localities in Czechoslovakia. Some ecological data and lists of associated species are provided.—[D.H.K.]

432/2. PEDICULARIS SYLVATICA L. Skogen, A., 1966, Pedicularis silvatica L. ssp. hibernica D. A. Webb ny for Norge, *Blyttia*, **1966**, 361-367. *Pedicularis sylvatica* subsp. *hibernica* is reported from Norway. The subspecies is new to Scandinavia and details are given of its ecology and history. The taxonomic status of the subspecies is also discussed.—[D.H.K.]

433. RHINANTHUS. Tiagi, B., 1966, Development of the seed and fruit in Rhinanthus major and R. serotinus, *Am. J. Bot.*, **53**, 645-651.

439.→ OROBANCHACEAE. Ross-Craig, S., 1966, *Drawings of British Plants*, 23. *Scrophulariaceae* (2), *Orobanchaceae*, *Lentibulariaceae*, *Verbenaceae*, 38 plates. G. Bell & Sons. London.

440. OROBANCHE. Gilli, A., 1966, Bestimmungsschlussel der mitteleuropäischen varietaten und formen von Orobanche, *Ver. zool.-Bot. Ges. Wien*, **105/106**, 171-181. A key is given to the identification of the various species and varieties of *Orobanche* found in mid-Europe.—[D.H.K.]

441.→ LENTIBULARIACEAE.—See 440.→ OROBANCHACEAE.

442. UTRICULARIA. Mohd, F., 1967, Trichomes on the flowers of Utricularia, *J. Indian bot. Soc.*, **45**, 242-246.

442. UTRICULARIA. Thanikaimoni, G., 1966, Pollen morphology of the genus Utricularia, *Pollen et Spores*, **8**, 265-284.

442/4. UTRICULARIA MINOR L. Hartmann, W., 1967, Untersuchungen zur Wachstumsruhe in den Turionen von Utricularia minor L., Hydrocharis morsus-ranae L. und Stratiotes aloides L., *Ber. dt. bot. Ges.*, **80**, 61-68. Experimental studies on the growth of *Utricularia minor*, *Hydrocharis morsus-ranae* and *Stratiotes aloides*.—[D.H.K.]

444.→ VERBENACEAE.—See 440.→ OROBANCHACEAE.

445.→ LABIATAE. Knowles, E., 1967, Cultivars of British wild plants, 8. Woundworts and Yellow Archangel, *Gdnrs' Chron.*, **161** (20), 14. *Betonica officinalis* var. 'alba' and var. 'grandiflora', *Stachys germanica*, *S. alpina* and *Lamiastrum galeobdolon* (*Galeobdolon luteum*) 'variegatum' are all referred to as wild British species adapted for the garden.—[D.H.K.]

445. MENTHA. Baquar, S. R. & Reese, G., 1965, Cytotaxonomische und gaschromatographische Untersuchungen an norddeutschen Mentha-Formen, *Pharmazie*, **20,** 159-168 & 214-219.

445. MENTHA. de Alencastro, F. M. M. R., Scatone, Z., Prisco, J. & Laboriau, L. F. G., 1965, *Contribuicão para uma bibliografia do gênero Mentha L.*, 1, *Boletim Especial*, 1. Pp. 345. Assoçiacão Brasileira de Pesquisas sôbre Plantas Aromáticas e Oleos Essencias. São Paulo, Brasil. A bibliography of *Mentha* devoted mainly to plant physiology and the chemistry of essential oils.—[D.H.K.]

445. MENTHA. Harley, R. M. & Bell, M. G., 1967, Taxonomic analysis of herbarium material by gas chromatography, *Nature*, **213,** 1241-1242. In an attempt to ascertain the origins of the polymorphic species *Mentha spicata* a large collection of living material of *Mentha* has been brought together at the University of Bristol and a taxonomic survey of mint oils by gas chromatography has been commenced. This technique has been applied also with success to herbarium material of *Mentha*, including specimens collected over a century ago. The preliminary results suggest that *M. alopecuroides* is probably a single clone, and a similar conclusion is reached in respect of *M. citrata*.—[D.H.K.]

445. MENTHA. Ikeda, N., 1965, Studies on Mentha viridis L. and Mentha longifolia (L.) Huds., *Jap. J. Pl. Breed.*, **15,** 31-39.

445. MENTHA. Lebeau, J., 1966, Pourquoi ne récoltierons-nous pas de Menthes?, *Nat. Mosana*, **18,** 105-122.

445. MENTHA. Sobti, S. N., 1965, Chromosome numbers in species of Mentha, *Proc. Indian Acad. Sci., ser. B,* **62,** 145-148.

445/7. MENTHA SUAVEOLENS Ehrh. (M. rotundifolia auct., non (L.) Huds.). Harley, R. M., 1965, *Biosystematic study in Mentha; population structure in Mentha suaveolens*, in Lloyd, J. R., *et al.*, *Sherborne School Expedition to the Atlas Mountains, Morocco*, 1964. Sherborne School, Dorset.

448. THYMUS. Bonnet, A. L. M., 1966, Contribution à l'étude caryologique du genre Thymus L., 4. A propos de Thymus nervosus J. Gay ex Roussine, Thymus alpigenus Kerner et Thymus vulgaris L. de la flore française, *Naturalia monspel., Sér. Bot.*, **17,** 21-29. Counts of the somatic chromosome numbers have been made on three species of *Thymus* from southern France—*T. nervosus* from the Pyrenees and alpine systems had $2n = 28$; *T. alpigenus* had $2n = 28$ and 56, the latter number is in accordance with counts made on the species in other parts of Europe, the previous number had not hitherto been reported. *T. vulgaris* had $2n = 50$, which is in accordance with counts made on Swiss material.—[D.H.K.]

448. THYMUS. Jalas, J. & Kaleva, K., 1967, Chromosome studies in Thymus L. (Labiatae), 5, *Annls. Bot. Fenn.*, **4,** 74-80.

448. THYMUS. Kaleva, K., 1967, Notes on some epidermal characteristics in Thymus L. (Labiatae), *Annls. Bot. Fenn.*, **4,** 95-101.

448. THYMUS. Pedersen, A., 1967, De danske former of Thymus serpyllum L.; Mill., *Flora Fauna Silkeborg*, **73**, 45-54. A revision of the varieties of *Thymus serpyllum* in Denmark, with a key to their identification. Distribution maps of the different varieties are provided.—[D.H.K.]

448. THYMUS. Pawlowski, B., 1966, Observations ad Thymos polonicos et nonnullos ucrainicos pertinentes, *Fragm. Flor. geobot.*, **12**, 387-412. A revision of *Thymus* in Poland and adjacent areas of the Ukraine, with descriptions, synonymy, distribution data, etc. Four new hybrids are described, and previous work on the genus in Poland is reviewed.—[D.H.K.]

448. THYMUS. Sorsa, P., 1966, Pollen morphological studies in the genus Thymus L. (Labiatae), *Annls. Bot. Fenn.*, **3**, 140-146.

453/1. CLINOPODIUM VULGARE L. Von Bothmer, R., 1967, Intraspecific variation in Clinopodium vulgare L. (Labiatae), *Bot. notiser*, **120**, 202-208. Three geographically vicarious subspecies of *Clinopodium vulgare* are described, based on differences in the size of calyx tube, calyx teeth and leaves. *C. vulgare* L. subsp. *vulgare* has a northern range and occurs throughout Europe, with the exception of the Mediterranean area, parts of Asia Minor, Canada to Newfoundland and in the United States southwards to North Carolina and the Rocky Mountains, elsewhere in the U.S.A. it is regarded as an introduction.

C. vulgare L. subsp. *villosa* (De Noé) Bothm., comb. nov., occurs on the Mediterranean coast of north-west Africa and in southern Spain and Portugal.

C. vulgare L. subsp. *orientale* Bothm., subsp. nov., is mainly in the eastern Mediterranean, including the whole of Greece, in Turkey south of the range of subsp. *vulgare*, Syria and Iran, it is found also in southern and central Italy, Sicily, Sardinia and southern France.—[D.H.K.]

455/g. SALVIA GLUTINOSA L. Hiemayer, F., 1966, Über das Vorkommen der Klebrigen Salbeis (Salvia glutinosa) in der Umgebung von Augsberg, *Ber. Naturw. Ver. Schwaben*, **70**, 10-11. A short account of the discovery of *Salvia glutinosa* near Augsberg, Germany.—[D.H.K.]

461/1. LAMIASTRUM GALEOBDOLON (L.) Ehrendorf. & Polatschek (*Galeobdolon luteum* Huds.).—See 462. LAMIUM.

462. LAMIUM. Dvoraková, M., 1965, Taxonomický prehled ceskoslovenských druhů rodu Lamium L., *Spisy Přírod. Univ. Purkyne Brne*, **459**, 31-50. A revision of *Lamium* in Czechoslovakia.—[D.H.K.]

462. LAMIUM. Simms, W. F., 1967, Ornamental Dead-nettle species worthy of the garden, *Gdnrs' Chron.*, **161** (1), 11. Among *Lamium* species considered worthy of cultivation are various forms of *Lamium maculatum* and also of *Lamiastrum galeobdolon*.—[D.H.K.]

470/1. TEUCRIUM CHAMAEDRYS L. Gryzbek, J., 1966, Badania famobotaniczne nad Teucrium chamaedrys L., 1. Morfologia i anatomia, *Acta biol. cracov. sér. Bot.*, **8**, 147-154. Morphological and anatomical studies on *Teucrium chamaedrys* in connection with pharmo-botanical investigations.—[D.H.K.]

470/4. TEUCRIUM SCORODONIA L. Hutchinson, T. C., 1967, Ecotype differentiation in Tuecrium scorodonia with respect to susceptibility to lime-induced chlorosis and to shade factors, *New Phytol.*, **66**, 439-453.

470/4. TEUCRIUM SCORODONIA L. Mousseau, M., 1966, Influence de l'éclairemént sá l'assimilation journalière et annuele du Teucrium scorodonia, *Oecol. Plant.*, **1**, 103-115.

472. PLANTAGO. Ahmed, Z. F., Batanouny, K. H. & Hammoudea, F. M., 1965, Taxonomy, ecology and pharmogascony of the common Egyptian Plantago species, *Planta Medica*, **23**, 28-38. A number of species which also occur in Britain are included in this account of *Plantago* in Egypt.—[D.H.K.]

472. PLANTAGO. Bassett, I. J., 1967, Taxonomy of Plantago L. in North America: Sections Holopsyllium Pilger, Palaeopsyllium Pilger and Lamprosantha Decne., *Can. J. Bot.*, **45**, 565-577. A revision of *Plantago* Sections *Holopsyllium*, *Palaeopsyllium* and *Lamprosantha* in North America. Six native and one introduced species, *Plantago media*, are recognised. Descriptions, synonymy, chromosome numbers and phytogeographical data are provided. *P. media* is sparingly but widely introduced from New Brunswick to British Columbia, it is also widely distributed in the United States; the chromosome number $2n = 24$ was obtained from counts on Canadian material.—[D.H.K.]

472. PLANTAGO. Misra, R. C., 1966, Morphological studies in Plantago, 1. Germination of seed and seedling anatomy, J. *Indian bot. Soc.*, **45**, 116-121.

472. PLANTAGO. Runemark, H., 1967, Studies in the Aegean Flora, 10. Cytologic and morphologic notes on Plantago, *Bot. notiser*, **120**, 9-16. Aegean material of a number of species of *Plantago* has been cytologically investigated and the following chromosome numbers are reported:—*P. major* L. subsp. *intermedia* Lge., $2n = 12$; *P. coronopus* L. subsp. *coronopus*, $2n = 10$; *P. coronopus* L. subsp. *commutata* (Guss.) Pilg., $2n = 20$; *P. psyllium* L., $2n = 12$; *P. lanceolata* L., $2n = 12$ and *P. lagopus* L., $2n = 12$.—[D.H.K.]

472/1. PLANTAGO MAJOR L. Salisbury, E. J., 1966, The productivity of the large-sized segregates of Plantago major L., *Kew Bull.*, **20**, 429-431.

474.→ CAMPANULACEAE. Gadella, T. W. J., 1966, Some notes on the delimitation of genera in the Campanulaceae, *Proc. K. ned. Akad. Wet., ser. c., Biol. Med. Sci.*, **69**, 502-521.

475. CAMPANULA. Gadella, T. W. J., 1967, The taxonomic significance of two artificially produced hybrids in the genus Campanula, *Acta Bot. neerl.*, **15**, 624-629. Artificial hybrids were experimentally produced between two species pairs in *Campanula*, viz. *C. persicifolia* and *C. latiloba* DC. and *C. alliariifolia* and *C. ochroleuca* (Kem. Nath.) Kem. Nath. The hybrid between *C. persicifolia* and *C. latiloba* is completely sterile, and for this reason the treatment of the two taxa as separate species is considered reasonable. The hybrid between *C. alliariifolia* and *C. ochroleuca*, on the other hand, is completely fertile and the two species are best regarded as conspecific.—[D.H.K.]

475. CAMPANULA. Kovanda, M., 1966, Some chromosome counts in the Campanula rotundifolia complex, 12, *Folia Geobot. & Phyto-Taxon. Bohem.* **3**, 268-273. Chromosome counts have been made on material from 21 populations of *Campanula rotundifolia* and 4 of *C. polymorpha* (Witasek) Prain, *et al.* The material was gathered from different localities in Czechoslovakia, Denmark, England, Germany and Sweden. The diploid *C. rotundifolia* appears to be rather frequent in central Europe: 13 samples in all proved to be diploid, including material from England. This is the first time that the occurrence of diploid *C. rotundifolia* has been detected in the British Isles. Scattered tetraploid individuals and triploid hybrids were also found in four diploid samples. *C. polymorpha* from the western Carpathians is a tetraploid with $2n = 68$.—[Author's summary]. The British material examined all of which had $2n = 34$, came from Norfolk, Cambridge and Berwick.—[D.H.K.]

475/3. CAMPANULA RAPUNCULOIDES L. Sladzký, Z., 1966, Experimental study of floral morphogenesis, 1. Study of developmental possibilities of floral primordia in Campanula rapunculoides L. and Veronica austriaca L. subsp. austriaca, *Preslia*, **38**, 356-362.

475/7. CAMPANULA ROTUNDIFOLIA L. Böcher, T. W., 1966, Experimental and cytological studies on plant species, 11. North Atlantic tetraploids of the Campanula rotundifolia complex, *Annls. Bot. Fenn.*, **3**, 287-298.

478. PHYTEUMA. Ochlewska, M., 1966, Badania cytologiczne nad rodzajem Phyteuma L., *Acta Bìol. cracov., sér. bot.*, **8**, 135-145. Cytological studies on Polish species of *Phyteuma.*—[D.H.K.]

485. GALIUM. Kliphuis, E., 1967, Cytotaxonomic notes on some Galium species, *Acta bot. neerl.*, **15**, 535-538. Cytological studies on *Galium aparine* has produced the chromosome numbers $2n = 22$, 44, 66, and 68, though no morphological differences could be detected in the different races. Examination of *G. mollugo* from 91 different localities, on the other hand, showed the species always to be a tetraploid with $2n = 44$, though great morphological variation was noted in different populations, and this remained constant after growing the plants for several years under controlled conditions.

G. saxatile provides an example of a species in which morphological differences are associated with the level of polyploidy, and these differences remained constant after growing plants in controlled conditions for several years. The diploid ($2n = 22$) is distinguished from the tetraploid ($2n = 44$) by its more fragile habit, more slender shoots, smaller flowers and leaves, and by the fact that it flowers about two weeks earlier than the tetraploid. The European range of the species is reviewed and a table shows the results of measurements made on plants from Portugal and the Netherlands.—[D.H.K.]

487.→ CAPRIFOLIACEAE. Troll, W. & Weberling, F., 1966, Die Inforeszenzen der Caprifoliaceen und ihre systematische Bedeutung, *Abh. Akad. Wiss.* (*Mainz*), **1966**, 455-605.

487. SAMBUCUS. Knowles, E., 1967, Cultivars of British wild plants, 12. Elders and Viburnums, *Gdnrs' Chron.*, **161** (25), 14. At least 14 cultivars of *Sambucus nigra* are known, mostly relating to flower and fruit colour. Several cultivars of *Viburnum opulus* are also grown in gardens and *V. lantana* is sometimes cultivated. —[D.H.K.]

488. VIBURNUM.—See 487. SAMBUCUS.

491. LONICERA. Nicolini, G., 1965, Il caprifoglio, *Ital. agric.*, **102,** 707-721. Notes on the history, taxonomy and cultivation of *Lonicera* species in Italy.—[D.H.K.]

491. LONICERA. Rudenberg, L. & Green, P. S., 1966, A karyological survey of Lonicera, 1, *J. Arnold Arbor.*, **47**, 222-247.

492/1. LEYCESTERIA FORMOSA Wall. Curran, P. L., 1967, Leycesteria formosa Wall. in Co. Kildare, *Ir. Nat. J.*, **15**, 305. Records the regeneration and spread of the Himalayan species *Leycestria formosa* along hedgerows and ditchbanks on the Lyons Estate, Colbridge, Co. Kildare. The species was probably originally planted as a covert for pheasant cover.—[D.H.K.]

493/1. ADOXA MOSCHATELLINA L. Müller-Schneider, P., 1967, Zur Verbreitungsbiologie des Moschuskrautes (Adoxa moschatellina), *Vegetatio*, **15**, 27-32.

497.→ DIPSACACEAE. Tortajada, J. M., 1964, Contribucion al estudio de las Dipsacaceas Españolas, *Bol. Inst. Nac. Invest. Agron.* (*Madrid*), **24,** 123-216. A revision the Spanish species of the family Dipsacaceae.—[D.H.K.]

502/p. BIDENS PILOSA L. Ohtani, S. & Suzuki, S., 1960, Some notes on Bidens pilosa L. [Compositae] and its new varieties, var. intermedia and var. bisetosa, *Sci. Rep. Yokusuka City Mus.*, **5**, 14-17. Two new varieties of *Bidens pilosa*, a species which occurs as a wool adventive in Britain, are described.—[D.H.K.]

503. GALINSOGA. Richter-Rethwisch, F., 1966, The distribution of Galinsoga parviflora (Cav.) and Galinsoga ciliata (Raf.) Blake in the German Federal Republic, *Z. pflKrankh. pflPath. pflSchutz*, 1965, *Sonderheft*, **3**, 35-38.

505/1. XANTHIUM STRUMARIUM L. Kaul, V., 1965-66, Physiological ecology of Xanthium strumarium L., 1. Seasonal morphological variants and distribution, *Trop. Ecol.*, **6,** 72-87: 2. Physiology of seeds in relation to its distribution, *J. Indian bot. Soc.*, **44,** 365-380.

506. SENECIO. Afzelius, K., 1967, Chromosome numbers in some Senecioneae, *Svensk. bot. Tidskr.*, **67,** 1-9. Chromosome numbers are given for a number of species of *Senecio* and closely related genera from various parts of the world.—[D.H.K.]

506. SENECIO. Koyama, H., 1966, On the Section Nemosenecio of the genus Senecio, *Acta phytotax. geobot.*, **41,** 15-20.

506. SENECIO. Wischmann, F., 1966, Senecio fuchsii C. C. Gmel. og Cirsium dissectum (L.) Hill, to anthropocher nye for Norge, *Blyttia*, **1966,** 381-388. *Senecio fuchsii* and *Cirsium dissectum* are recorded as new adventives to Norway.—[D.H.K.]

506/1. SENECIO JACOBAEA L. Anon., 1966, Second European insect introduced for biological control of range weed, *Agric. Res. Wash.*, **15** (6), 14. In California the cinnabar moth (*Tyria jacobaeae*) introduced from Europe for the biological control of *Senecio jacobaea* has been found to also infest certain commercial crops, e.g. lettuce, endive, etc. A second insect, the seed fly (*Hylemya sencilla*) has now been introduced from Europe to supplement the control of *S. jacobaea*, the fly attacks this species, but does not apparently infest any other plants. Tests have indicated that the larvae survive only on *S. jacobaea*.—[D.H.K.]

508/1. TUSSILAGO FARFARA L. Abrami, G., 1967, Ricerche sui ritmo antesico, 2. Contributo ricerche fenologiche su Primula acaulis Hill e Tussilago farfara L., *G. bot. ital.*, **72,** 576-582. Phenological studies on *Primula acaulis* and *Tussilago farfara* in Italy.—[D.H.K.]

509. PETASITES. Nevotný, L., Toman, J., Starý, F., Marquez, A. D., Herout, V. & Sorm, F., 1966, Contribution to the chemotaxonomy of some European Petasites species, *Phytochem.*, **5,** 1281-1287.

509. PETASITES. Sandina, I. B., 1966, Morfologiceskie i biologiceskie osobennosti vidov belokepythika Petasites v svjazi s ikh sistematiceskim položekhiem, *Bot. Zh. SSSR*, **51,** 1127-1134.

514. FILAGO. Wagenitz, G., 1966, Die Sektion Evacopsis der Gattung Filago (Compositae-Inuleae) im Westlichen Mittelmeergebiet, *Ber. dt. bot. Ges.*, **79,** 336-342. An account of *Filago* Section *Evacopsis* in the western Mediterranean region.—[D.H.K.]

517. ANTENNARIA. Urbanska-Woytkiewicz, K., 1967, Cytological investigations in Antennaria Gaertn. from North Scandinavia, *Acta boreal., A, Scientia*, **22,** 1-14. Studies on *Antennaria dioica*, $2n = 28$; *A. carpathica* (Wg.) Bluff & Fingerh., $2n = 28$ & 42; *A. alpina* (L.) Gaertn., $2n = 70$, 84 & 85; *A. alpina* (L.) Gaertn. f. *rosea* Langerb., $2n = 70$ and *A. porsildii* Elis. Ekm., $2n = 70$, in northern Norway. The distribution, and degree of polyploidy in the genus in Europe is discussed.—[D.H.K.]

533. CHRYSANTHEMUM. Favarger, C. & Villard, M., 1965, Contribution à la cytotaxinomie et à la cytogéographie des marguerites d'Europe: Chrysanthemum leucanthemum L. et taxa voisins, *C. r. hebd. Séanc. Acad. Sci., Paris*, **261,** 497-498. Cytotaxonomic notes on the *Chrysanthemum leucanthemum* complex.—[D.H.K.]

535/1. ARTEMISIA VULGARIS L. Koul, M. L. H., 1964, Cytogenetics of polyploids, 1. Cytology of polyploid Artemisia vulgaris, *Caryologia*, **29,** 407-414.

535/7. ARTEMISIA MARITIMA L. Koul, M. L. H., 1965, Cytogenetics of polyploids, 2. Cytology of polyploid Artemisia maritima Linn., *Cytologia*, **30,** 1-9.

536. ECHINOPS. Henson, K. J. W., 1965, Het Echinops-sortiment van botanische tuinen en Nederlandse vasteplantenkwekers, *Med. Bot. Tuin. Belmonte Arb.*, **9,** 84-96. A revision of the species of *Echinops* grown in botanic gardens, nurseries,

etc., in Holland, based on studies made between 1963 and 1965. Only a few species, varieties and cultivars appear to be grown, viz. *E. banaticus* Roch. ex Schrad., *E. banaticus* 'Blue Globe' and 'Taplow Blue' and **E. exaltatus** Schrad. (*E. strictus* Fisch. ex Sims, *E. commutatus* Juratzka), three other taxa are also grown, viz. *E. ritro* L. var. *ruthenicus* (Bieb.) Hay., *E. ritro* L. var. *tenuifolius* (Fisch.) DC. and *E. sphaerocephalus* L., these three are, however, mainly confined to botanic gardens.

E. banaticus was discovered in Romania and brought into cultivation in 1823, *E. exaltatus* is native from Austria to Bulgaria and the western Ukraine. *E. ritro* is a variable species from southern Europe, its var. *tenuifolius* being chiefly found in south-eastern and eastern Europe, and var. *ruthenicus* in south-east Europe. *E. sphaerocephalus* is native in southern Europe.

Many plants in nurseries and botanic gardens were found to be incorrectly named, and the treatment given in horticultural manuals was invariably found to be inaccurate.

The following key is provided to the identification of the species:—

1 Plant under 1·25 m high, leaves underneath white-tomentose. Involucral bracts and corolla bluish-violet 2

Plant up to 2-2·5 m high, leaves underneath thinly greyish-white-tomentose. Involucral bracts greyish-green, sometimes tinged with violet; corolla from whitish to pale blue 3

2 Plant 30-60 cm high. Leaves deeply 1-3 pinnatifid into oblong, lanceolate, or linear segments ± coriaceous, upper surface glabrous and smooth. Heads 12-17 mm long; outer bristle-like bracts of the involucre 4-5 mm *E. ritro*

Plant up to 1-1·25 m high. Radical and lower cauline leaves deeply pinnatifid into oblong acute segments, rather thin, upper surfaces scabrous and with scattered hairs, glandular ones among others. Heads up to 22 mm long; outer bristle-like bracts of the involucre 5-10 mm *E. banaticus*

3 Stems, upper surfaces of the leaves and backside of the involucral bracts glandular-pubescent *E. sphaerocephalus*

Plants not glandular, lower parts of stem excepted *E. exaltatus*

E. ritro var. *tenuifolius* has leaves 2-3 pinnatifid into linear segments set shorter apart, the prickles are shorter and the heads smaller. *E. ritro* var. *ruthenicus* is a more vigorous plant with leaves pinnatifid into oblong triangular segments, the prickles are slender and the heads rather large.—[D.H.K.]

537. CARLINA. Meusel, H. & Werner, K., 1962, Über die Gliederung von Carlina acaulis L. und Carlina vulgaris L., *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **11**, 279-292. Studies on *Carlina acaulis* and *C. vulgaris* in Germany.—[D.H.K.]

539. CARDUUS. Anon., 1966, Slender thistles (Carduus tenuiflorus and Carduus pycnocephalus) declared noxious weeds, *Tasm. J. Agric.*, **37**, 322-324. *Carduus tenuiflorus* and *C. pycnocephalus* introduced into Tasmania from Eurasia have now become a serious pest in pastures and meadowland. Methods of control are discussed.—[D.H.K.]

540. CIRSIUM. Williams, J. T., 1966, Variation in the germination of several Cirsium species, *Trop. Ecol.*, **7**, 1-7.

540/4. CIRSIUM ARVENSE (L.) Scop. Palavëeva-Kovachevska, M., 1966, Njakoi biologieňi osobenosti pri palomidata, *Rast. Nauki* (*Sofia*), **3**, 57-68. Notes on biological peculiarities in *Cirsium arvense*.—[D.H.K.]

540/4. Cirsium arvense (L.) Scop.—See 556/2. Sonchus arvensis L.

540/8. Cirsium dissectum (L.) Hill.—See 506. Senecio.

542. Onopordum. Fjaden, W. L., 1967, Onopordums: The cotton thistles, *Gdnrs' Chron.*, **162** (2), 12-13. A short account of some of the species of *Onopordum* in cultivation.—[D.H.K.]

544. Centaurea. Gulyás, S. & Pesti, J., 1966, Angaben zur Anatomie der Nektarien der Centaureae, *Acta Univ. szeged.*, **12**, 17-24.

544. Centaurea. Runemark, H., 1967, Studies in the Aegean Flora, 12. Cytologic and morphologic investigations in Centaurea, *Bot. notiser*, **120**, 161-176.

552. Tragopogon. Clausen, J., 1966, Stability of genetic characters in Tragopogon species through 200 years, *Trans. Proc. bot. Soc. Edinb.*, **40**, 148-158.

552. Tragopogon. Hall, M. T., Persell, J. V. & Thompson, P. W., 1966, Variability in wild populations in the genus Tragopon in Michigan and Indiana, *Michigan Bot.*, **5**, 79-91.

552/2. Tragopogon porrifolius L. Dolfien, H. R., 1966, De blauwe morgenster, *Natura*, **63**, 99. A short account of *Tragopogon porrifolius* in Holland.—[D.H.K.]

556. Sonchus. Dahl, E., 1966, Sonchus uliginosus MB. i Norge, *Blyttia*, **1966**, 161-164. *Sonchus uliginosus* Bieb. is considered a distinct species, differing from *S. arvensis* by glabrous pedicels and involucres, chromosome number, $2n = 42$, against $2n = 56$ in *S. arvensis* besides other taxonomic characters. The shape of the heads at the defloration stage is different, the involucre is longer in *S. arvensis* (mean 15-12 mm, standard deviation 0·91 mm, and range 14-17 mm, based on 17 collections from near Oslo) than in *S. uliginosus* (mean 12·20 mm, standard deviation 1·40 mm, range 10-15 mm, based on 20 collections from near Oslo). The inflorescences in *S. uliginosus* are subumbellate while in *S. arvensis* the inflorescences are more dichotomically branched, though subumbellate inflorescences occasionally occur.

S. uliginosus probably arrived in Norway around the middle of the nineteenth century and remained rare up to 1900. Today it is common around Oslo and also occurs in scattered localities in south and west Norway and in Tröndelag.—[Author's summary]

556/2. Sonchus arvensis L. Gruzdev, G. S. & Tulikov, A. M., 1966, Vegetative regeneration in Sonchus arvensis and Cirsium setosum, *Izv. timiryazev. sel'-koz Akad.*, **6**, 83-95. The biology of the reproduction and methods of control of *Sonchus arvensis* and *Cirsium arvense* var. *setosum* was studied in 1959-60 in the Tambov Province of the U.S.S.R. Roots of *S. arvensis* were found to penetrate to a depth of 40-60 cm, though the bulk of the regeneration roots were within 20 cm of soil level. Roots of *C. arvense* var. *setosum* were found to penetrate to a depth of over 200 cm. Various methods of control are put forward but the destruction of the roots and the prevention of new productive roots is essential.—[D.H.K.]

558. Hieracium. de Retz, B., 1966, Contributions à la connaissance de la flore hiéraciologique de la France, 1. Quelques espèces ou sous-espèces de Hieracium nouvelle pour la flore de France, *Bull. Soc. bot. Fr.*, **112**, 442-448.

558. Hieracium. Öskarsson, I., 1966, Synopsis and revision of Icelandic Hieracia, *Vis. Islend.*, **37**. Pp. 142. A full scale revision of Hieracium in Iceland, including the description of a number of new species.—[D.H.K.]

558. Hieracium. Sell, P. D. & West, C., 1967, Kent Hieracia, *Trans. Kent F. C.*, **3**, 132. Several amendments are made to the key to the species of *Hieracium* found in Kent published in *Trans. Kent Fld Club*, **3**, 50-54 (1965).—[D.H.K.]

559. Crepis. Grob, R., 1966, Zytotaxonomische Untersuchungen an Crepis capillaris und Crepis nicaeensis und ihren F1-Bastarden, *Ber. schweiz. bot. Ges.*,

76, 306-351. Studies in the evolution of the genus *Crepis*, and in particular the origin of *C. capillaris*.—[D.H.K.]

559/s. Crepis sancta (L.) Babc. Van Kasteel, J., 1967, Crepis sancta (L.) Babc. in België, *Gorteria*, **3,** 164. A further new station in Belgium is reported for the adventive species *Crepis sancta*.—[D.H.K.]

560. Taraxacum. Fürnkranz, D., 1966, Untersuchungen an Populationen des Taraxacum-officinale-Komplexes in Kontaktegebiet der diploiden und polyploiden Biotypen, *Öst. bot. Z.*, **113,** 427-447. Studies on the *Taraxacum officinale* complex in lower Austria. Investigation of five populations showed that most contained diploid and polyploid plants. Purely diploid and purely polyploid populations were found to be rare.—[D.H.K.]

560. Taraxacum. Hudziok, G., 1967, Neue Taraxacum-Arten der Sektion Palustria Dahlstedt aus Norddeutschland, *Feddes Rep.*, **75,** 131-139. Four new species of *Taraxacum* Section *Palustria* are described from northern Germany.—[D.H.K.]

560. Taraxacum. Raionsala, A., 1967, Taraxaca nova, 6, *Annls. Bot. Fenn.*, **4,** 102-115. A number of new species of *Taraxacum* are described from Fennoscandia.—[D.H.K.]

560. Taraxacum. Van Soest, J. L., 1966, New Taraxacum species from Europe, 1-4, *Proc. K. ned. Akad. Wet., ser. c, Biol. and Med. Sci.*, **69,** 432-489. Nearly 50 new species of *Taraxacum* are described from various parts of Europe, ranging from France to Austria, Turkey and southern Russia.—[D.H.K.]

560. Taraxacum. Van Soest, J. L., 1966, Taraxacum lanjouwii v. Soest, a new species from Switzerland, *Acta bot. neerl.*, **15,** 34-35.

560. Taraxacum. Van Soest, J. L., 1967, Taraxacum euryphyllum (Dahlst.) Christ. in Nederland, *Gorteria*, **3,** 104-108. *Taraxacum euryphyllum* of the Sect. *Spectabilia* has been found in two localities in the island of Texel. It is new to the Netherlands.—[D.H.K.]

560/1. Taraxacum officinale Weber. Smith, E. B., 1965, A reversion in Taraxacum officinale, *Trans. Kans. Acad. Sci.*, **68,** 266-268.

560/1. Taraxacum officinale Weber. Wassink, E. C., 1965, Some introductory notes on Taraxacum officinale L. as an experimental plant for morphogenetic and production research, *Meded. LandbHoogesch. hogeschool Wageningen*, **65** (16), 1-15.

560/2. Taraxacum palustre (Lyons) DC. Malecka, J., 1966, Badania embriologiczne nad Taraxacum palustre, *Acta biol. cracov., Sér. bot.*, **8,** 223-235. Karyological studies on Polish material of *Taraxacum palustre*. The chromosome numbers $2n = 24, 26, 32$ & 40 are reported.—[D.H.K.]

560/c. Callistephus chinensis (L.) Nees. Nechanský, F. & Jirásek, V., 1967, Systematische Studie über kultivierte Sommerastern (Gartenastern)- Callistephus chinensis (L.) Nees (Asteraceae), *Preslia*, **39,** 122-150. A taxonomic and morphologic study of *Callistephus chinensis*, including the description of a number of new cultivars.—[D.H.K.]

560/s. Sigesbeckia. Geissert, F. & Philippi, G., 1967, Sigesbeckia cordifolia H. B. et K. adventice nouvelle en France, *Monde des Plantes*, **354,** 2.

566.→ Butomaceae. Stant, M. Y., 1967, Anatomy of the Butomaceae, *J. Linn. Soc., Bot.*, **60,** 31-60.

567/1. Hydrocharis morsus-ranae L.—See 442/4. Utricularia minor L.

568/1. Stratiotes aloides L.—See 442/4. Utricularia minor L.

570. Elodea. Mühlberg, H., 1963, Elodea occidentalis (Pursh) St. John, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12,** 677-678. *Elodea occidentalis* (Pursh) St. John, an American species closely related to *E. canadensis* has been found in Germany, presumably as an aquarists' outcast. The differences between the two species are described.—[D.H.K.]

573/1. Scheuchzeria palustris L. Șerbanesco-Jitariu, G., 1966, Considérations sur le gynécée et le fruit de Scheuchzeria palustris L., *Rev. Roum. Biol., Sér. Bot.*, **11,** 435-439.

576/1. Zostera marina L. Larne, U., 1967, Meriajokkan, Zostera marina L., pohjoisrajasta Sekämarella, *Luonnon Tutk.*, **77,** 40-46.

577/19. Potamogeton crispus L. Skulberg, O. M., 1965, New data on Potamogeton crispus L. in Norway, *Blyttia*, **23,** 52-56.

577/21. Potamogeton pectinatus L. Yeo, R. R., 1965, Life history of Sago Pondweed, *Weeds*, **13,** 314-321.

579. Ruppia. Reese, G., 1963, Über die deutschen Ruppia- und Zannichellin-Kategorien und ihre Verbreitung in Schleswig-Holstein, *Sch. naturw. Ver. Schlesw.-Holst.*, **34,** 44-70. The following chromosome numbers are given from counts made on material from Schleswig-Holstein:—*Ruppia maritima* var. *maritima*, $2n = 20$; *R. maritima* var. *brevirostris*, $2n = 40$; *R. spiralis*, $2n = 40$; *Zannichellia palustris*, $2n = 24, 32, 34$ & 36.—[D.H.K.]

579. Ruppia. Schwanitz, G., 1967, Untersuchungen zur postmeiotischen Mikrosporogenese, 1. Morphogenese des Ruppia-pollens, *Pollen et Spores*, **9,** 9-48.

580. Zannichellia.—See 579. Ruppia.

588/1. Convallaria majalis L. Morrison, B., 1967, Lily of the Valley, *Gdnrs' Chron.*, **161** (35), 21. The history, folk lore and legendary connections of *Convallaria majalis* are briefly reviewed.—[D.H.K.]

588/1. Convallaria majalis L. Poirion, L., 1966, Convallaria majalis dans l'extrême sud-est de la France, *Monde des Plantes*, **350,** 10.

591. Asparagus. Zilm, B., 1966, Zytogenetische Untersuchungen an Asparagus officinalis L. in ihrer Bedeutung für die Züchtung rein maunlicher und polyploider Sorten, *Z. pflZücht.*, **56,** 1-26. Cytogenetical studies on *Asparagus officinalis.*—[D.H.K.]

598/1. Ornithogalum umbellatum L. Willis, J. C. N., 1967, Common Star of Bethlehem, Dove's Dung, Ornithogalum umbellatum, *Trans. Suffolk Nat. Soc.*, **13,** 324-325. The history, status and distribution of *Ornithogalum umbellatum* in Suffolk is reviewed, and notes provided on alleged medical properties, folklore, etc. of the species.—[D.H.K.]

601. Muscari. Garbari, F., 1967, Contributo allo studio citoligico dei Muscari italiani, *Caryologia*, **19,** 419-428. Cytotaxonomical studies on Italian species of *Muscari. M. comosum* has $2n = 18$.—[D.H.K.]

602. Colchicum. Fell, K. R., Ramsden, D. & Trease, G. E., 1966, Diagnostic anatomical features of certain species of Colchicum, *Planta Medica*, **14,** 209-216.

603/1. Paris quadrifolia L. Pelt, J., Hayon, J. C. & Lectard, P., 1966, Observations de quelques anomalies chez Paris quadrifolia L., *Bull. Soc. lorr. Sci.*, **6,** 27-30. Modifications to the usual tetramerous structure of *Paris quadrifolia* observed in dense populations in the forest of Haye (Meurthe-et-Moselle) are described, illustrated and discussed.—[E.B.B.]

605/1. Juncus squarrosus L. Welch, D., 1967, Communities containing Juncus squarrosus in Upper Teesdale, England, *Vegetatio*, **14,** 229-240.

605/5. Juncus gerardii Lois. Hämet-Ahti, L., 1966, Variation of Juncus gerardii Lois. in Northern Fennoscandia, *Annls. Bot. Fenn.*, **3,** 391-398.

605/16. JUNCUS CAPITATUS Weigel. Kral, R., 1966, Juncus capitatus (Juncaceae) previously reported from the United States, *Sida*, **2**, 436. Contrary to a recent report of *Juncus capitatus* as an adventive new to the United States, the author points out that he has discovered that it was recorded from California in 1959 and from Texas in 1962.—[D.H.K.]

606. LUZULA. Bernardini, J. V. & Lima-de-Faria, A., 1967, Asynchrony of DNA Replication in the chromosomes of Luzula, *Chromosoma*, **22**, 91-100.

606. LUZULA. Hair, J. B., 1967, Contributions to a chromosome atlas of the New Zealand Flora, 8. Luzula (Juncaceae), *N. Z. J. Bot.*, **5**, 17-21. Documentated chromosome numbers are given for the 14 species and 9 varieties of *Luzula* known from New Zealand. The chromosome numbers of the introduced Eurasian species are *L. campestris*, $2n = 12$; *L. congesta* (Thuill.) Lej., $2n = 48$ and *L. multiflora*, $2n = 36$.—[D.H.K.]

606/6. LUZULA SPICATA (L.) DC. Amen, R. D., 1965, Seed dormancy in the alpine rush, Luzula spicata L., *Ecology*, **46**, 361-364. Observations made on *Luzula spicata* in the alpine tundra of the Colorado Front Range, United States, showed considerable dormancy in the germination of seeds. This was found to be due to a hard waxy layer covering the entire seed coat. Scarification of this layer resulted in germination, and it is assumed that in nature this is eventually achieved by the abrasive action of soil particles on the seed.—[D.H.K.]

607. ALLIUM. Brat, S. Ved, 1965, Genetic systems in Allium, 2. Meiosis and breeding systems, *Heredity*, **20**, 325-329.

607. ALLIUM. Wendelbo, P., 1966, The genus Allium, *Lily Year Book*, **30** (1967), 86-100, plates 17-21 (1966).

607/5. ALLIUM VINEALE L. Davis, F. S. & Peters, E. J., 1965, Reproductive cycles of wild garlic and nomenclature of plant and bulb types, *Weeds*, **13**, 84-87.

607/5. ALLIUM VINEALE L. Peters, E. J., Stritzke, J. F. & Davis, F. S., 1965, Wild garlic: its characteristics and control, *Agric. Handbook Agric. Res. Serv. Washington*, **298**. Pp. 23. *Allium vineale* is described and an account given of its distribution, ecology, biology and morphology. The chemical control of the species which is a pernicious weed in parts of the United States is discussed.—[D.H.K.]

607/8. ALLIUM SCHOENOPRASUM L. Turesson, G., 1966, Genecological notes on Allium schoenoprasum, *Trans. Proc. bot. Soc. Edinb.*, **40**, 181-184.

607/10. ALLIUM TRIQUETRUM L. Nutt, R. D., 1967, A note on Allium triquetrum, *Q. Bull. alp. Gdn Soc.*, **35**, 59.

607/7. ALLIUM CARINATUM L. Sopova, M., 1966, The pairing of chromosomes in Allium carinatum L., *Ann. Fac. Sci. Nat. Univ. Skopje*, **17-18**, 95-103.

612. GALANTHUS. Artiushenko, Z. T., 1965, K sistematike roda Galanthus L., *Bot. Zh. SSSR.*, **50**, 1430-1447. Systematic studies on *Galanthus*.—[D.H.K.]—Translated into English and published as 'Taxonomy of the genus Galanthus L.' in the *Daffodil and Tulip Year Book*, **32**, 62-82 + 5 plates (1967).—[D.H.K.]

612. GALANTHUS. Artiushenko, Z. T., 1966, Kriticeskij obzor roda Galanthus L., *Bot. Zh. SSSR.*, **51**, 1437-1451. Further critical studies on *Galanthus*.—[D.H.K.]

614. NARCISSUS. Meyer, F. G., 1966, Narcissus species and wild hybrids, *Am. hort. Mag.*, **45**, 47-76.

616. IRIS. Knowles, E., 1967, Cultivars of British wild plants, 19. Irises and Orchids, *Gdnrs' Chron.*, **162** (6), 14. Several cultivars of *Iris pseudacorus* are grown in gardens, principally 'bastardi' with pale yellow flowers without orange markings; 'Acoriformis', which has brown-veins on the petals instead of the usual purple and 'Variegata' which has creamy-yellow variegated leaves. *I. foetidissima* is also sometimes cultivated.—[D.H.K.]

616/4. Iris pseudacorus L. Preece, S. J., 1965, Iris pseudacorus in Montana, *Proc. Mont. Acad. Sci.*, **24,** 1-4. The Eurasian species *Iris pseudacorus* was discovered as an adventive in Montana in 1958. A detailed search showed that the species was widely naturalised by rivers, ditches and ponds over a wide area. It is thought that the species was grown by an Iris specialist about 1925 (it is rarely cultivated in gardens in Montana), and that seeds or tubers were carried down a small stream to one of the larger rivers.—[D.H.K.]

616/4. Iris pseudacorus L. Polito de Rosa, M., 1966, Osservazioni cariologiche su Iris pseudacorus L., *Annali. Fac. Sci. agr. Univ. Napoli*, **30,** 93-100.

618. Crocus. Rogers, O. M. & Walker, D. E., 1967, Chromosome numbers of some cultivated Crocus, *J. Heredity*, **58,** 68.

621. Gladiolus. Kowatschew, I., 1965, Beitrag zur Erforschung der Systematik von Gattung Gladiolus L. in dem Mittelmeergebiet sowie in Mittel -und Sudeuropa, *Wiss. Arb. Landwirtschaft. Hochschule 'Wassil Kolarow'*, **14,** 59-67. Studies on Gladiolus in the Mediterranean region, mid and southern Europe.—[D.H.K.]

624.→ Orchidaceae. d'Alleizette, M. C., 1967, Étude sur les variations des Orchidées du groupe Dactylorchis des prairies du Sud-Ouest de la France, *Bull. Soc. bot. Fr.*, **113,** 344-349. Studies on *Dactylorhiza* collected in Charente, and a discussion on *Orchis sesquipedalis* and on the numerous forms of *Orchis* found in the area. The systematic value of *O. sesquipedalis* is reviewed and it is concluded that this and other forms are ancient and complex hybrids, resulting in the formation of a hybridogen group, to which the author designates the name of × *O. sesquipedaliformis*.—[E.B.B. & D.H.K.]

624.→ Orchidaceae. Arditti, J., 1967, Factors affecting the germination of orchid seeds, *Bot. Rev.*, **33,** 1-97. The various factors affecting the germination of the seeds of orchids are reviewed and commented upon. These include orchid mycorrhiza and symbiosis, effects of vitamins, hormones, temperature and moisture.—[D.H.K.]

624.→ Orchidaceae. Harrais, G. & Hadley, G., 1967, The relation between host and endophyte in orchid mycorrhiza, *New Phytol.*, **66,** 205-215.

624.→ Orchidaceae. Knowles, E., 1967, Cultivars of British wild plants, 19. Irises and Orchids, *Gdnrs' Chron.*, **162** (6), 14. Among cultivars of British orchids are *Gymnadenia conopsea* 'Alba' and 'Efacarta', both white-flowered, but the latter with flowers lacking spurs, *Orchis purpurea* 'Albida', with a white 'helmet' and labellum, and *O. morio* 'Alba', also with a white 'hood' and labellum, *Dactylorhiza incarnata* subsp. *incarnata* 'Lagotis', with purple flowers with dark bands on the labellum, and 'Glasnevin', with finer leaves, smaller flowers than the type, which are of a deep red colour; the latter two are sometimes seen in 'water-gardens'. *Ophrys apifera* and *Platanthera chlorantha* are also sometimes cultivated.—[D.H.K.]

625. Epipactis. Senghas, K., 1966, Beobachtungen zur Gattung Epipactis in Mitteleuropa, *Orchidee* (*Hamburg*), **17,** 122-124.

625/2. Epipactis helleborine (L.) Crantz. Howell, J. T., 1966, Helleborine in California, *Leafl. west. Bot.*, **10,** 299-300. The earliest evidence of the European *Epipactis helleborine* as an adventive in California is a specimen collected as a 'weed' in a nursery at Belmont in 1950. The species sometimes occurs spontaneously in gardens and is thought to have been introduced with shrubs imported from Europe. It is now quite naturalised in a number of places in the Santa Cruz Mountains.—[D.H.K.]

625/3. Epipactis purpurata Sm. Hiemeyer, F., 1967, Über das Vorkommen der Violetten Stendelwurz (Epipactis sessilifolia) um Augsberg und über bemerkenswerte Funde im Jahr 1966, *Ber. naturw. Ver. schwaben*, **71**, 35-40. An account of the occurrence of *Epipactis purpurata* at Augsberg, Germany in 1966.—[D.H.K.]

625/4. Epipactis leptochila (Godfery) Godfery. Seth-Smith, D. W., 1967, The Chiltern Orchid, *Gdnrs' Chron.*, **162** (2), 15. The English name Chiltern Orchid is suggested for *Epipactis leptochila*; a species which is frequent in the beech woods of the Chiltern Hills.—[D.H.K.]

627/1. Spiranthes spiralis (L.) Chevall. Wells, T. C. E., 1967, Changes in a population of Spiranthes spiralis (L.) Chevall at Knocking Hoe National Nature Reserve, Bedfordshire, 1962-1965, *J. Ecol.*, **55**, 83-99. Detailed observations on a population of *Spiranthes spiralis* in chalk downland at Knocking Hoe, Bedfordshire over a period of four seasons.The mean height, flowering, etc. of individual plants were noted annually. Increase in the population by vegetative reproduction was found to be slow, and the study showed that there appeared to be no evidence to support the view that large fluctuations in the numbers of plants in flower occurred from year to year.—[D.H.K.]

631/1. Hammabya paludosa (L.) Kuntze. Bultez, P. & Dupontreué, G., 1966, Une des plus rares Orchidées de France: le Malaxis des marais (Malaxis paludosa (L.) Schwartz) existe-t-il encore en Picardie, *Rev. Fed. Franc. Soc. Sci. Nat.*, **5**, 142-144. The recorded history of *Hammarbya paludosa* in Picardy is summarised and a brief description given. The authors' opinion is that it is not yet extinct in Picardy and should still be searched for.—[E.B.B.]

640. Ophrys. Fenner, H., 1966, Ophrys-Bastarde, *Orchidee* (*Hamburg*), **17**, 129-131.

640/3. Ophrys sphegodes Mill. Stapperfenne, H.-J., 1963, Ophrys sphegodes Mill. —ein element des mediterranen Florengebietes im nördlichen Thüringen, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12**, 713-715. Phytosociological notes on *Ophrys sphegodes* in north Thuringia, Germany.—[D.H.K.]

642/3. Orchis simia L. Wilks, H. M., 1966, The Monkey Orchid in East Kent, *Handbk. a. Rep. Soc. Promot. Nat. Reserves.*, **49**, 79-80.

643. Dactylorhiza. Soó, R., 1967, Die Dactylorhiza-Arten und-Formen in der Flora Rumäniens, *Rev. Roum. Biol. Sér. Bot.*, **12**, 225-231. A revision of *Dactylorhiza* in Romania, with descriptions, synonymy, etc.—[D.H.K.]

643. Dactylorhiza. Vaucher, C., 1966, Contribution a l'étude cytologique du genre Dactylorchis (Klinge) Vermeulen, *Bull. Soc. Neuchâtel. Sci. nat.*, **89**, 75-85. The author has studied 73 specimens of the group *Dactylorhiza maculata s. l.*, *D. incarnata* and *D. latifolia* from the central Jura and the borders of the subjurassic lakes. For *D. incarnata* and *D. latifolia* the observations agree with those published in other countries. The *D. maculata* group is represented in the region by two taxa, one diploid ($2n = 40$) which corresponds more or less morphologically to *D. fuchsii* var. *meyeri*, the other tetraploid ($2n = 80$) identical with *D. maculata s. s.* The author just as Kliphuis and Engel insists on the difficulty of recognising these two taxa by their morphology. They have, however, different ecological requirements, the first growing exclusively in alkaline flat-moors at low altitude, and the second having less specialised requirements and is also found in Sphagnum-bogs. A specimen with $2n + 60 \pm$ has been observed in the Creux-du-Van region. The presence of *D. fuchsii* var. *meyeri* at Cudrefin and Fenil is new for Switzerland.—[Author's summary, p.p.]

643/5. Dactylorhiza purpurella (T. & T. A. Stephenson) Soó. Harrais, G. & Hadley, G., 1967, The development of *Orchis purpurella* in symbiotic and inoculated cultures, *New Phytol.*, **66**, 217-230.

643/7. Dactylorhiza traunsteineri (Sauter) Soó. Kaad, P., 1967, Om Dactylorhiza traunsteineri (Saut.) Soó på Laeso, *Flora Faund Silkeborg*, **73**, 1-5. Studies on *Dactylorhiza traunsteineri* in Jutland.—[D.H.K.]

646.→ ARACEAE. Eyde, R. H., Nicholson, D. H. & Sherwin, P., 1967, A survey of floral anatomy in Araceae, *Am. Nat.*, **101,** 478-497.

650.→ LEMNACEAE. Daubs, E. H., 1965, A monograph of Lemnaceae, *Illinois Biol. Monogr.*, **34,** 1-118 + 21 plates. A world wide revision of the Lemnaceae with descriptions and illustrations of the species, synonymy, keys, details of geographical distribution, etc.—[D.H.K.]

650. LEMNA. Jovet, P. & Jovet-Ast, S., 1966, Lemna Valdiviana Philippi, espèce signalee pour la première fois en Europe, *Bull. Cent. Étud. Rech.-Scient., Biarritz*, **6,** 57-64. *Lemna valdiviana* Philippi, a species of the eastern and south-eastern states of the U.S.A., Mexico, Central and South America is reported from the Biarritz area of France. It is an adventive new to Europe, and resembles *L. minor*, the sides of the fronds are, however, nearly parallel, and the fronds asymmetrical. It probably originated as an outcast from an aquarium, and should be searched for in Britain.—[D.H.K.]

650. LEMNA. de Sloover, J.-L., 1966, La fronde, la graine, et la germination, d'un Lemna, *Naturalistes belg.*, **47,** 443-456. Observations on the leaves, seeds and germination of *Lemna minor* and *L. gibba*.—[D.H.K.]

650/3. LEMNA MINOR L. de Sloover, J.-L., 1961, Note sur le pollen de Lemna minor L., *Pollen et Spores*, **3,** 5-10.

653. TYPHA. McNaughton, S. J., 1966, Ecotype function in the Typha community type, *Ecol. Monogr.*, **36,** 297-325.

653/1. TYPHA LATIFOLIA L. White, D. A., 1966, Vegetative spreading of cattails through carp disturbance, *Am. Midl. Nat.*, **76,** 510. During observations at Utah Lake, Utah, U.S.A., in the summer of 1962 the author noted that carp pushed or rooted at the bases of clumps of *Typha latifolia*, often lifting a submerged stem out of the water, after which it settled in a different position. Thirty two disturbed stems were marked and studied; within two weeks they had rooted, and by the autumn had become small firmly rooted clumps, though there was no evidence of their flowering.—[D.H.K.]

655/3. SCIRPUS MARITIMUS L. Juguet, M., 1966, Embryogénie des Cypéracées. Développement de l'embrijon chez le Scirpus maritimus L., *C. r. hebd. Séanc. Acad. Sci., Paris*, **263,** 1710-1713.

655/8. SCIRPUS LACUSTRIS L. Seidel, K., Scheffer, F., Kickuth, R. & Schlimme, E., 1967, Mixotrophie bei Scirpus lacustris L., *Naturwissenschaften*, **54,** 176-177.

656. ELEOCHARIS. Zukowski, W., 1965, Rodzoj Eleocharis R. Br. w Polsce, *Poznan. Tow. Przyj. Nauk. Biol.*, **30** (2), 1-113. A revision of the Polish species of *Eleocharis*. —[D.H.K.]

659/1. SCHOENUS NIGRICANS L. Sparling, J. H., 1967, The occurrence of Schoenus nigricans L. in blanket bogs, 1. Environmental conditions affecting the growth of S. nigricans in blanket bog, *J. Ecol.*, **55,** 1-14: 2. Experiments on the growth of S. nigricans under controlled conditions, *loc. cit.*, **55,** 15-32.

661/1. CLADIUM MARISCUS (L.) Pohl. Hofsten, U., 1965, The Norwegian Cladium mariscus communities and their post-glacial history, *Årbok Univ. Bergen*, **1965** (4), 1-55 + 6 plates.

663. CAREX. Dietrich, W., 1967, Die Zytotaxonomie de Carex Sektion Frigidae in Europe, *Feddes Rep.*, **75,** 1-42. A revision of *Carex* Section *Frigidae*. Most of the species concerned are confined to mid and central Europe.—[D.H.K.]

663. CAREX. Egorova, T. V., 1966, *Osoki SSSR vidy Podroda Vignea*. Pp. 264. Academia Scientiarum U. R. S. S. Mockba. A revision of *Carex* Section *Vignea* in the U.S.S.R., with full descriptions, synonymy and keys, etc. Maps showing the European distribution of each species are provided. Many Carices also found in Britain are included in this useful monograph.—[D.H.K.]

663. CAREX. Kern, J., 1967, Carex hartmanii Caj. in Nederland, *Gorteria*, **3**, 93-96. *Carex hartmanii* Caji, a sedge new for the Netherlands, was discovered on Terschelling, one of the Frisian Islands. It grows there abundantly in a marshy dune valley west of the Boschplaat. The species is closely allied to *C. buxbaumi* Wahlenb., from which it differs chiefly by the cylindrical, not club-shaped, terminal spikelet, the shorter lowest bract, and the distinctly nerved, smaller utricles.—[Author's summary]

663. CAREX. Smith, D. L., 1967, The experimental control of inflorescence development in Carex, *Ann. Bot.*, **31**, 19-30.

663. CAREX. Westhoff, V. & Ketner, P., 1967, Milieu en vegetatie von Carex hartmanii Caj. op Terschelling, in het kader van een oecologische vergelijking tussen deze soort en Carex buxbaumii Wahlenb., *Gorteria*, **3**, 119-126. *Carex hartmanii* Caj., a sedge new for the Netherlands and closely allied to *C. buxbaumii* Wahlenb., is ecologically compared to the latter. Whereas the habitat of *C. buxbaumii* presents a geographical gradient from a Central European eutrophic environment of swamps and wet meadows (*Magnocaricion* and *Cnidio-Juncetum juncetosum subnodulosi*) up to, in Sweden, a nearly ombrotrophic vegetation of a raised bog. *Carex hartmanii* does not show such a gradient. It is known from a slightly more dry and acid habitat (compared to *C. buxbaumii*) in Central Europe (*Cnidio-Juncetum juncetosum acutiflori*) up to damp rivulet meadows rich in nutrients in S. Sweden (Calthion). Both species are, however, contrasting in such a way, that in Central Europe *C. hartmanii* is more acidophilous than *C. buxbaumii*, whereas in S. Sweden the former seems to be more basiphilous than the latter.

The Dutch habitat on the island of Terschelling has been analysed. *Carex hartmanii* is differential here for the *Ophioglosso-Calamagrostietum epigeios*, a community of older secondary dune valleys slightly overblown with sand, and with strongly fluctuating water level, submersed in winter, running dry in summer. This habitat appears to be richer in nutrients than the environment of *C. buxbaumii* in the Netherlands. Consequently the ecological position of both species in the Netherlands is more related to that in Sweden than to that in Central Europe, and corresponds with the boreal character of the Dutch Wadden district.—[Authors' summary]

663/11. CAREX EXTENSA Good. Rørslett, B., 1966, Nyedata om utbredelse og sosiologi for Carex extensa Good. i Norge, *Blyttia*, **1960**, 339-345. Notes on the distribution and ecology of *Carex extensa* in Norway where it is an extremely rare species.—[D.H.K.]

663/23. CAREX STRIGOSA Huds. Gancev, L. & Dencev, S., 1965, Floristicni materiali ot Slivenski Okrag, *Izv. bot. Inst. Sof.*, **15**, 265-267. The discovery of *Carex strigosa* in Bulgaria is reported.—[D.H.K.]

663/56 × 54. CAREX DIANDRA Schrank × C. PANICULATA L. Muller, F. M., 1967, Carex diandra Schrank × C. paniculata L. (C. × beckmannii F. W. Schultz) nieuw voor Nederland, *Gorteria*, **3**, 161-163. The sterile hybrid of *Carex diandra* Schrank and *C. paniculata* L. was found in two localities in the north-western part of the province of Overijssel in disturbed peat bog vegetation. The literature referring to this hybrid is reviewed. The name *Carex* × *beckmannii* F. W. Schultz was published in 1887, and if published with a description, has priority over the name *C.* × *germanica* Richter ex Aschers. & Graebn., 1902.

The habitats of the hybrid are compared with those of the typical forms of the parents, and of a densely tufted form of *Carex diandra* which is rather common in the above mentioned region.—[Author's summary]

663/69. CAREX ELONGATA L. Naustdal, J., 1966, Carex elongata på Vestlandet, *Blyttia*, **1966**, 280-285.

663/82. Carex davalliana Sm. Vicherek, J., 1967, Príspevek k poznání vegetage slattiných luk s Carex davalliana Sm. u Vranovic na jižni Morave, *Preslia*, **39,** 95-96.

664.→ Gramineae. *Anais do Nono Congresso Internacional de Pastagens/Anales de Noveno Congreso Internacional de Pasturas/Proceedings of the Ninth International Grassland Congress.* Vol. 1. Pp. lxiv + 911: Vol. 2. Pp. 915-1974. São Paulo. 1965. An account of the Proceedings and the papers read at the Ninth International Grassland Congress held in Brazil from Jan. 8 to 19 1965.—[D.H.K.]

664.→ Gramineae. Barnard, R. C. (Editor), 1964, *Grasses and Grasslands.* Pp. viii + 269. London.

664.→ Gramineae. Blondon, F., 1965, Évolution des conceptions sur les exigences pour la floraison des Graminées prairiales, *Bull. École Nat. Super. Agron. Nancy*, **7,** 101-110.

664.→ Gramineae. Bommer, D. F. R., 1965, Effects of gibberellic acid on herbage grasses, *Anais Nono Congr. Intern. Past.*, 436-438.

664.→ Gramineae. Bowden, B., 1965, Modern grass taxonomy, *Outl. Agric.*, **4,** 243-253.

664.→ Gramineae. Bowden, W. M., 1967, Taxonomy of intergeneric hybrids of the tribe Triticeae from North America, *Can. J. Bot.*, **45,** 711-724.

664.→ Gramineae. Canode, C. L. & Robocker, W. C., 1966, Annual weed control in seedling grasses, *Weeds*, **14,** 306-309.

664.→ Gramineae. Christie, B. R., Gamble, E. E. & Tossell, W. E., 1965, Using male sterility to produce grass hybrids, *Anais Nono Congr. Intern. Past.*, 195-199.

664.→ Gramineae. Dougall, H. W. & Birch, H. F., 1966, pH of grasses in relation to genera, *Nature*, **210,** 844.

664.→ Gramineae. Gervais, C., 1966, Nombres chromosomiques chez quelques graminées alpines, *Bull. Soc. Neuchâtel. Sci. nat.*, **89,** 87-100.

664.→ Gramineae. Holden, J. H. W., 1966, Species relationships in the Avenae, *Chromosoma*, **20,** 75-124.

664.→ Gramineae. Kent, D. H., 1967, Notes on some Middlesex grasses, *Lond. Nat.*, **46,** 36-39. Notes on the distribution of *Festuca heterophylla*, *Vulpia myuros*, *Puccinellia distans*, *Nardurus maritimus*, *Poa compressa*, *P. subcaerulea*, *P. palustris*, *Bromus diandrus* and *B. carinatus* in Middlesex.—[D.H.K.]

664.→ Gramineae. Knowles, E., 1967, Cultivars of British wild plants, 15. Grasses, *Gdnrs' Chron.*, **162** (2), 14. Notes on dwarf, variegated and striped forms of British grasses in cultivation, including *Phragmites communis*, *Molinia caerulea*, *Glyceria maxima*, *Puccinellia maritima*, *Dactylis glomerata*, *Melica uniflora*, *Arrenatherum elatius*, *Holcus lanatus*, *H. mollis*, *Alopecurus pratensis* and *Phalaris arundinacea.*—[D.H.K.]

664.→ Gramineae. McClintock, D., 1966, Wild bamboos in Britain, *Wildlife and the Countryside*, **259,** 2-4. A short account of some of the species of bamboo which are naturalised or established in Britain, these include *Arundinaria vagans*, *A. humilis*, *Sasa palmata* (*S. sennanensis*), *Arundinaria anceps*, *A. japonica* and *A. simonsi.* Short descriptions of these are given.—[D.H.K.]

664.→ Gramineae. McClure, F. A., 1966, *The Bamboos, a Fresh Perspective.* Pp. 368 + 99 illustrations. Cambridge.

664.→ Gramineae. MacColl, D. & Cooper, J. P., 1967, Climatic variation in forage grasses, 3. Seasonal changes in growth and assimilation in climatic races of Lolium, Dactylis and Festuca, *J. appl. Ecol.*, **4,** 113-127.

664.→ Gramineae. Pohl, R. W., 1966, The grasses of Iowa, *Iowa St. . Sci.*, **40,** 341-573. A revision of the grasses of Iowa, with descriptions, synonymy, keys and many line drawings.—[D.H.K.]

664.→ Gramineae. Singh, D. N., 1966, Classification of Gramineae in relation to cytology, *Advg. Front. Pl. Sci.*, **17,** 197-203.

664.→ Gramineae. Smith, S. J., 1965, Checklist of the grasses of New York State, *Bull. N.Y. St. Mus. Sci. Serv.*, **403,** Pp. 44.

665/1. Phragmites communis Trin. Rychnovská, M., 1967, A contribution to the autecology of Phragmites communis Trin., 1. Physiological heterogeneity of leaves, *Folia Geobot. Phyto-Taxon. Bohem.*, **2,** 179-188.

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716. SPARTINA. Marchant, C. J., 1967, Evolution in Spartina (Gramineae), 1. The history and morphology of the genus in Britain, *J. Linn. Soc., Bot.*, **60,** 1-24. The history of the genus *Spartina* in Britain is traced from herbarium records and publications. This historical information and a morphological study of living plants strengthen the view that sterile *S.* × *townsendii* arose in *c.* 1870 in Southampton Water as a hybrid between native *S. maritima* and introduced American *S. alterniflora*. The fertile Amphidiploid arose in 1890 and spread at the expense of the species populations. It is shown that species and hybrids of the *S.* × *townsendii* complex can be separated by a combination of a few well-defined morphological characters, and by stomata and pollen grain details.

A polyhaploid seedling of low vigour among Amphidiploid progeny is described and its existence and resemblence to *S.* × *townsendii* F_1 emphasizes the relationship between this F_1 hybrid and the Amphidiploid. Putative backcross hybrids of *S.* × *townsendii* Amphidiploid with *S. alterniflora* in Southampton Water provide conclusive evidence of *S.* × *townsendii* hybrid origin.—[Author's summary]

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Panicum dichotomiflorum Michx. ('Fall Panicum') an American grass which has become a serious pest of maize crops in Italy.—[D.H.K.]. This interesting species was gathered by Mrs. B. Welch at Springwell Lock, near Harefield, Middlesex, where it was introduced with soya beans from the United States, in 1945. The late Mrs. Agnes Chase, who was at that time the leading authority on the grasses of the United States, and who confirmed the tentative identification wrote that it was the first known occurrence of the species in Europe.—[D.H.K.]

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TOPOGRAPHICAL

0, SARNIA: GUERNSEY. Jee, N., 1966, Botanical report, 1965, *Rep. Trans. Soc. guernés.*, **17,** 697-699. × *Asplenophyllitis microdon* (T. Moore) Alston (*Asplenium obovatum* × *Phyllitis scolopendrium*) is reported from a hedgebank in the Castel, and *Nicandra physalodes*, an adventive new to Guernsey is recorded as appearing simultaneously in two fields of kale.—[D.H.K.]

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HAYASHI, I. & NUMATA, M. 1967, Ecology of pioneer species of early stages in secondary succession, 1, *Bot. Mag., Tokyo*, **80**, 1-22. Autecological studies on a number of species at Kartô, central Japan. A comparative analysis of their germination behaviour was made in an attempt to account for the mechanism of plant succession. Among the species studied were *Ambrosia elatior*, *Erigeron annuus*, *Chenopodium album* and *Polygonum nodosum*.—[D.H.K.]

HESLOP-HARRISON, J., 1966, Reflections on the role of environmentally-governed reproductive versatility in the adaption of plant populations, *Trans. Proc. bot. Soc. Edinb.*, **40**, 159-168.

HUSOVÁ, M., 1967, Azidophile Eichenwalder auf Quarziten im Tribec-Gebirge, Slowakei, *Folia Geobot. Phyto.-Taxon.*, **2**, 121-136. Phytocoenological and ecological Studies of acidiphilous oak forest of quartzizes in the Tribec Mountains of Western Slovakia.—[D.H.K.]

JACKSON, M. T., 1966, Effects of microclimate on spring flowering phenology, *Ecology*, **47**, 407-415.

KVĚT, J., 1967, Productivity studies in the woodland herbaceous vegetation, *Acta Univ. Carol. Biol.*, **1966**, *Suppl.* 1/2, 123-125.

LEMEE, G., 1967, Sur l'intérêt écologique des réserves biologiques de la forêt de Fontainebleu, *Bull. Soc. bot. Fr.* **113**, 305-323. A study of the tree population, the floristic composition and the soils of these biological reserves is of great importance in the study of forest ecology.—[D.H.K.]

OLDFIELD, F., 1966, Introduction to the ecological history of N.W. England, *Changing Scene*, **3**, 5-19.

ORLOCI, L., 1967, An agglomerative method for classification of plant communities, *J. Ecol.*, **55**, 193-206.

ROSSITER, R. C., 1966, Ecology of the Mediterranean annual-type pasture, *Adv. Agron.* **18**, 1-56.

STEFFAN, A. W., 1967, Paläobotanik und Phytosoziologie im Dienste zoophylogenetischer und zoogeographischer Untersuchungen an Phytophagen Insekten Chemiptera, Aphidoidea), in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 239-256. A study of terrestrial biotypes and the close ecological connections between certain species of plants and animals, in particular aphids.—[D.H.K.]

VAN DER PIJL, L., 1966, Ecological aspects of fruit evolution, a functional study of dispersal organs, *Proc. K. ned. Akad. Wet., ser. C. Biol. Med. Sci.*, **49**, 597-640.

VAN DER VOO, E. E., 1964, De govolgen van de Wateronttrekking voor de flora van de 'Groote Meer' ondo Ossendrecht, *Gorteria*, **3**, 126-130.

WESSON, G. & WAREING, P. F., 1967, Light requirements of buried seeds, *Nature*, **213**, 600-601. Experiments carried out on a number of weedy species showed that the germination of some, e.g. *Hypochoeris radicata*, *Leontodon autumnalis*, *Rumex crispus*, *Senecio jacobaea*, *S. vulgaris*, *Sonchus asper* and *Tripleurospermum maritimum* subsp. *inodorum*, is promoted by light, while the germination of others, e.g. *Papaver dubium*, *Plantago lanceolata*, *P. media*, *Polygonum persicaria*, *P. aviculare*, *Sinapis arvensis*, *Spergula arvensis*, *Stellaria media* and *Trifolium repens*, is unaffected by light requirements.—[D.H.K.]

WHITTAKER, R. H., 1967, Gradient analysis of vegetation, *Biol. Rev.* (*Cambridge*), **42**, 207-264.

ZÓLOYOMI, B., et al., 1966, Einreihung von 1400 Arten der Ungarischen Flora in ökologische Gruppen nach TWR—Zahlen, *Fragm. Bot. Mues. Hist. Nat. Hung.* **4**, 101-142. A table is provided of 1400 Hungarian vascular plants grouped ecologically under temperature requirements, moisture requirements and soil preferences.—[D.H.K.]

PHYTOSOCIOLOGICAL AND PHYTOGEOGRAPHICAL

Altehage, C., 1965, Die Vegetationverhältnisse des Naturdenkmals 'Engelbergs Moor' in Druchhorn, Kreis Bersenbruck, *Veröff. naturw. Ver. Osnabr.*, **31**, 9-17.

Becherer, A., 1966, Fortschritte in der Systematik und Floristik der Systematik und Flotistik der Schweizerflora (Gefässpflanzen) in den Jahren 1964 und 1965, *Ber. schweiz. bot. Ges.* **46**, 97-145. Provides details of the more interesting records of Swiss plants made in 1964 and 1965.—[D.H.K.]

Blench, B. R., 1965, Strandmarken and Dueodde. A study of the dune regions of South Bornholm, *Geogr. Tidsskr.*, **64**, 36-53.

Bon, M., 1966, Notes Floristiques pour la Flore de Picardie, *Rev. Féd. Franc. Soc-Sci. Nat.*, **5**, 151-161. Detailed notes are given on a number of interesting species in the western area of Picardie, including *Geranium sylvaticum*, *Elymus arenarius*, *Thalictrum minus*, *Aconitum napellus*, *Linaria purpurea*, *Carduus* spp., *Cirsium* spp., *Primula* spp., and a number of species in Orchidaceae, particular attention being given to *Liparis loeselii*.—[E.B.B.]

Bouby, H., 1966, Apparition simultanée de deux adventices nouvelles pour Fontainebleau, *Bull. Mus. Nat. Hist. Paris*, **38**, 491-496. Two new adventives, *Oenothera sinuata* Michx. and *Ambrosia psilostachya* DC., both of N. American origin, were found on the perimeter of an army practice area in 1965 near Fontainebleau. A description is given of each with notes on distribution.—[E.B.B.]

Bournerais, M. & Jamagne, M., 1966, Flore, végétation et sols aux confins, de la Picardie, de l'Ile-de-France et de la Champagne, *Bull. Soc. r. Bot. Belg.*, **99**, 127-187. On the occasion of the annual excursion of the Royal Botanical Society of Belgium which in 1965 took place on the borders between the provinces of Picardie, Ile-de-France and Champagne, studies were made on the plant associations and soil types in this extremely complex area. The preliminary results of these studies showed that the extensive floristic returns (relevés), correlated with well-defined associations and soils from the most typical localities. The floristic and ecological characteristics of other localities visited are more briefly noted. From the biogeographical standpoint, this transitional area between the boreo-atlantic and francoatlantic zones offers over short distances, strongly marked floristic changes, as numerous species, particularly southern-European, mid-European, and submountainous ones reach the limit of their range here.—[E.B.B. & D.H.K.]

Claustres, G., 1966, Les Glunales des Pyrenees Ariegoises Centrales, *Botanica Rhedonica*, **1**, 1-493.

Debreczy, Z., 1966, Die xerothermen Rasen der Peter-und-Tamás-Berge bei Balatonarács, *Annls. hist-nat. Mus. natn. hung.*, **58**, 223-241.

Desfayes, M., 1966, Matérial pour une flore aquatique du Valais, *Bull. Murithienne*, **83**, 34-64. Many changes have taken place in the flora of the Rhone basin since Jaccard's *Catalogue de la flore valaisanne* was published in 1895. Some account is given of recent work on aquatic vascular plants and a list of the canals, ponds and lakes with their associated aquatic species is provided.—[E.B.B.].

De Smidt, J. T., 1967, Phytogeographical relations in the north west European heath, *Acta bot. neerl.*, **15**, 630-647.

Doing, H., 1966, A comparison of pasture weed problems in temperate Australia and Europe, *J. Aust. Inst. agric. Sci.*, **32**, 302-304. Many weedy species introduced from Eurasia, S. Africa and S. America into the wetter areas of temperate Australia quickly become established and often spread rapidly. The factors involved are discussed and it is suggested that among the possible causes are the stage of development of the land, comparable with that of Europe, 1,000 to 1,500 years ago, lack of intensive weed control, the irregular climate of temperate Australia and the lack of competition by the few native Australian weeds.—[D.H.K.]

Doing, H., 1966, Beschrijving van de vegetatie der duinen tussen Ijmuiden en Camperduin, *Meded. LandbHoogesch. Wageningen*, **66** (13), 1-63. A phytosociological analysis of the sand dune vegetation between Ijmuiden and Camperduin, province of North Holland.—[D.H.K.]

Duvigneaud, J., 1967, Flora et végétation halophiles de la Lorraine Orientale (Dép. Moselle, France), *Mém. Soc. Roy. Bot. Belg.*, **3**, Pp. 122.

Egorova, V. N., 1966, Interrelationship of Lathyris pratensis and Vicia cracca with other components of natural grassland in the seasonally flooded valley of the Oka river, *Bjull. Mosk. Obsc. Isp. Prir.* (*Biol.*), **71**, (4), 42-50.

Ernst, W., 1965, Ökologish-Soziologische Untersuchungen der Schwermetall. Pflanzengesellschaften Mitteleuropas unter Einschluss der Alpen, *Abh. Landesmus. Naturk Münster* (*Westfalen*), **27** (1). Pp. 54.

Freijsen, A. H. J., 1967, Some observations on the transition zone between the xerosere and halosere on the Boschplaat (Terschelling, the Netherlands) with special attention to Centaurium vulgare Rafn, *Acta bot. neerl.*, **15**, 668-682. Studies on saltmarsh communities on the West Friesian Island of Terschilling. Three important communities are recognised, the *Centaurieto-Saginetum moliniformis*, the *Sagineto maritimae-Cochlearietum danicae* and the *Juncetum gerardii*. Particular attention is given to the life cycle of *Centaurium littorale*.—[D.H.K.]

Friedrichs, K., 1967, Über den Gebrauch der Worte und Begriffe 'Gesellschaft' und 'Soziologie' in verschiedenen Sparten der Wissenschaft, in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 1-13. A review of the differences between animal- and plant-sociology.—[D.H.K.]

Froment, A., 1966, Les étapes de la recolonisation végétale après incendie de tourbe: comparaison entre le plateau des Hautes Fagnes et quelques autres tourbières européennes, *Lejeunia*, **40**, 1-13. An account of recolonisation, illustrated by tables and photographs, of bogs after intensive destruction of vegetation by fire.—[E.B.B.]

Fullerkrüg, E., 1967, Die Walgesellschaften und der Schenze bei Bad Gandersheim und ihre räumliche Gliederung, *Vegetatio*, **15**, 51-76.

Gutte, P., 1964, Bemerkungen zu einiger Adventiv- und Ruderal-Arten der weiteren Umgebung von Leipzig, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Kl. Reihe*, **13**, 664-669. Notes on adventive and ruderal plant associations found in the vicinity of Leipzig.—[D.H.K.]

Gutte, P., 1966, Die Verbreitung einiger Ruderpflanzengesellschaften in der weitern Umgebung von Leipzig, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Kl. Reihe*, **15**, 937-1010. A detailed phytosociological account of the ruderal flora of the Leipzig area.—[D.H.K.]

Haas, M., 1964, Die Vegetations- und Strandortsverhältnisse im Bereich der Gemarkung Poris-Lengefeld (Stadt-Gera), *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Sonderheft*, **1964**, 109-148.

Hansen, A., 1966, Nogle nye adventievarter i Danmark, 3, *Bot. tidsskr.*, **62**, 234-236. Adventive species new to the Danish flora include *Cycloloma atriplicifolium* (Spreng.) Coult., *Atriplex suberecta* Verdoorn, *Schkuhria pinnata* (Lam.) O. Kuntze, *Crambe abyssinica* Hochst., *Chrysanthemum viscido-hirtum* (Schott) Thell., *Digitaria adscendens*, (Humb., Bonth. & Kunth) Henrard and *Brachiaria platyphylla* (Griseb.) Nash.—[D.H.K.]

Heim, J., 1967, Relations entre les spectres sporopolliniques recents et la végétation actuelle, in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 44-47. The relationship between recent pollen spectra of surface samples and the existing vegetation of the Ardennes is compared and discussed.—[D.H.K.]

Hilbig, W., 1963, Die Unkrautbestände der Pfingstrosenkulturen am Alten Gleisberg bei Jendlöbnitz, Krs. Jena, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12**, 143-151.

Holub, J., **Hejný**, J., **Moravec**, J. & **Neuhäusl**, R., 1967, Ubersicht der höhern Vegetationseinheiten der Tschechoslowakei, *Rozpr, cesk. Akad. Ved.*, **77**(3). Pp. 75.

Holub, J. & **Jirásek**, V., 1967, Zur Vereinheitlichung der Terminologie in der Phytogeographie, *Folia Geobot. Phytotaxon. Bohem.*, **2**, 69-113. The many terms of general phytogeography used in botanical literature are reviewed and suggestions are made for improvements and more concise definitions of some of these terms.—[D.H.K.]

Hundt, R., 1963, Einige Beobachtungen über die etagale Differenzierung der subalpinen und alpinen Hochstaudenfluren am Nuolja und Slåttutjåkko in Schwedisch-Lappland, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12**, 651-668. Studies on the alpine and subalpine flora of various areas in Lapland.—[D.H.K.]

Hundt, R., 1964, Vegetation Feuchtigkeitsverhältnisse und Ertragsverhältnisse der Wiesenflächen in Luhne-Rückaltebecken bei Lengefeld (Thüringen), *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Sonderheft*, **1964**, 149-185.

Hundt, R., 1966, Einige Beobachtungen an Molinio-Arrhenathereted-Gesellschaften in Ost- und Nordostpolen Während der Excursion der Internationalen Vereinigung für Vegetationskunde 1963, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **15**, 149-160.

Hunziker, A. T., 1966, Adiciones al conocimiento de la flora del centro de Argentina, 1, *Kurtziana*, **3**, 221-231. Recent additions to the flora of Argentina include *Najas marina*.—[D.H.K.]

Jage, H., 1963, Zweiter Beitrag zur Kenntnis der Flora der Dubener Heide und der angrenzenden Gebiete, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12**, 695-706. Further distribution maps of German plant species are provided.—[D.H.K.]

Jasiewicz, A., 1966, Rósliny naczyniowe Bieszczadów Zachodnich, *Monographiae bot.*, **20**, 3-336. An account of the flora of the western Bieszczady Mountains, E. Carpathians, with a detailed floristic list, geographical, ecological and phytosociological data. Of particular interest is an account of the recolonisation of areas devastrated by fire in the Second World War.—[D.H.K.]

Klaus, H. & **Kudoke**, J., 1965, Vegetations kundliche Beobachtungen im Naturschutzgebiet Heilegen See nördlich Morkgrafenheide, *Arch. Freunde NatGesch. Mecklenb.*, **11**, 79-97.

Köhler, H., 1962, Vegetationskundliche Untersuchungen in der mitteldeutschen Ackertlandschaft, 5. Ackerunkrautgesellschaften einiger Auengebiete an Elbe und Mulde, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math. Nat. Reihe*, **11**, 207-250.

Kopecký, K., 1966, Ökologische Haupterunterschiede zwischen Röhrichtgesellschaften fliessender und stehender Binnengewässer Mitteleuropas, *Folia Geobot. Phyt.-Taxon. Bohem.*, **3**, 193-242. Studies on the differences between phytosociological groups found in reed communities in running water and in stagnant water in mid-Europe.—[D.H.K.]

Kopecký, K., 1967, Die flussbegleitende Neophytengesellschaft Impatienti-Solidaginetum in Mittelmähren, *Preslia*, **39**, 151-166. A new phytosociological association of naturalised adventive species is described from mid Moravia. The dominant species in the association are the N. American *Solidago gigantea*, *Helianthus decapetalus* and *H. rigidus* and the Himalayan *Impatiens glandulifera*. Other adventives commonly occurring in the association are *Aster novi-belgii* and *Rudbeckia laciniata*.—[D.H.K.]

Kornás, J., 1966, Rósliny naczyniowe Gorców Uzuplnienie, 2, *Fragm. Flor. geobot*, **12**, 141-149. An annotated list of the vascular plants of the Gorce Mountains (Polish Western Carpathians) was published in 1957 and a supplement was printed in 1963. The present paper consists of a second supplement, together with descriptive notes. A few native species new to the area are recorded, while adventives which have recently appeared include *Sisymbrium altissimum*, *Cymbalaria muralis*, *Veronica filiformis* and *Erigeron annuus*. Adventive species which have increased their range in the last few years are *Impatiens glandulifera* and *Diplotaxis muralis*.—[D.H.K.]

Kunkel, G., 1967, Plantas vasculares nuevas para la Flora de Gran Canaria: Enumeración Preliminar, *Cuad. Bot.*, **1**, 3-23. A preliminary list of species new to the flora of the Canary Islands, consisting of 165 phanerogams and vascular cryptogams, many of which also occur in Britain. The total number of vascular plants recorded from the Canaries now totals 928.—[D.H.K.]

Lambinon, J. & Duvigneaud, J., 1965, Un événement marquant dans l'histoire de la floristique Européene: la publication du volume 1 de 'Flora Europaea'. Ses incidences sur la floristique Belge et Luxembourgeoise, *Nat. Mosana*, **18, 1-17.**

Le Normand, M., 1966, Phytosociologie et phytoécologie des Landes entre Loniscat et Gouaree (C.-du-N.), *Botanica Rhedonica*, **2**, 1-35.

Lid, J., 1967, Synedria of twenty vascular plants from Svalbard, *Flora*, **86**, 481-493. Detailed notes on the associated species found with twenty selected vascular plants on an expedition to Svalbard, Spitzbergen, in 1924. Species of particular interest to British botanists are *Dryas octopetala*, *Polygonum viviparum*, *Betula nana* and *Carex rupestris*.—[D.H.K.]

Longton, R., 1965, Additions to the alien flora of South Georgia, *Brit. Antarctic Survey Bull.*, **5**, 47-49. The first adventive species to be recorded from South Georgia was *Poa annua* in 1902. Up to 1962 27 species of alien vascular plants had been noted, 5 of which were considered to be naturalised, and the remainder ephemeral. Data collected by the author in 1963-64 suggests that 3 of the species formerly considered to be casual, viz. *Agrostis tenuis*, *Deschampsia cespitosa* and *Rumex acetosella* have now become naturalised. In addition 5 new species were noted, viz.: *Matricaria matricarioides*, *Alchemilla monticola*, *Anthriscus sylvestris*, *Plantago major* and *Sagina procumbens*, for the present these are being treated as 'casuals'.—[D.H.K.]

Lötschert, W., 1966, Die Pflanzenwelt der Westwalder Seenplatte, *Natur und Museum*, **96**, 139-150.

Löve, A. & Löve, D., 1967, Biosystematics of widely disjunctive taxa.—[D.H.K.]

Mahn, E.-G., 1965, Vegetationsaufbau und Standorsverhältnisse der Kontinentalbeeniflufften Xerothermcasengesellschaften Mitteldeutschlands, *Abh. sächs. Akad. Wiss., Leipzig Math.-Nat.*, **49**(1). Pp. 138 + Taf. 8.

Mahn, E.-G. & Schubert, R., 1962, Vegetationskundliche Untersuchungen in der mitteldeutscher Ackerlandschaft, 6. Die Pflanzengesellschaften nördlich von Wanzleben (Magdeburger Börde), *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat.*, **11**, 765-816.

Mayer, H., 1967, Entstehung des nordalpinen Abieti-Fagetum, in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 56-68. A review of the origin and development of the *Abies-Fagus* woodlands of the northern Alps.—[D.H.K.]

Meusel, H. & Buhl, A., 1962, Arbeitsgemeinschaft mitteldeutscher Floristen Verbreitungskarten mitteldeutscher Leitpflanzen, 10, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat.Reihe*, **11**, 1245-1318. Distribution maps of many vascular plants in mid-Germany are given, including *Acer pseudo-platanus*, *A. platanoides*, *A. campestris*, *Ulmus* species, *Herminium monorchis* and *Pulsatilla vulgaris*.—[D.H.K.]

Mikyška, R., 1967, O rozširení neklerých lesních a lemových v severovýchodnich Cechác, *Preslia*, **39**, 178-197. Notes on a number of interesting species, including *Melica nutans*, in northern Bohemia.—[D.H.K.]

Moore, D. M., 1967, Further records for the vascular flora of the Falkland Islands, *Bot. notiser.*, **120**, 17-25. Several new species native to the Falkland Islands are described, and *Chrysanthemum leucanthemum*, *Pilosella aurantiaca* (*Hieracium aurantiacum*) and *Sedum acre*, not previously known, are added to the list of naturalised aliens.—[D.H.K.]

Moravec, J., 1967, Zu den azidophilen Trockenrasengesellschaften Sudwestböhmens und Bemerkungen zur Syntaxonomie der Klasse Sedo-Scleranthetea, *Folia Geobot. Phyto-Taxon Bohem.*, **2**, 137-178. Phytogeographical studies on acid crystallic siliceous rocks of the Bohemian Massive in the area of acidophilous oak forest of the alliance *Quercion robori-sesseliflorae* in the Otavar river area of south-west Bohemia.—[D.H.K.]

Mulligan, G. A., 1965, Recent colonisation by herbaceous plants in Canada, in Baker, H. G. & Stebbins, G. L. (Eds.). *The Genetics of Colonising Species; Proceedings of the First International Union of Biological Sciences*. Some introduced and native colonising weeds in Canada are reviewed in relation to their distribution, habitat preference, hybridization, polyploidy, etc.—[D.H.K.]

Muller, P. 1966, Die Entwicklung der Wälder im Suhrental, *Mitt. aargau. naturf. Ges.*, **27**, 5-100.

Nedelcu, C. A., 1967, Beiträge zum Phytosoziologischen studium des Cernica-Sees, *Vegetatio*, **15**, 33-50.

Neuhäusl, R. & Neuhäuslova-Novotna, Z., 1967, Syntaxonomische Revision der azidophilen Eichen- und Eichimischwälder im Westlichen Teile der Tschechoslowakei, *Folia Gebot. Phytotaxon Bohem.*, **2**, 1-41. A revision of the phytosociological elements of acidiophilous oak forests in Bohemia, Moravia and Silesia.—[D.H.K.]

Niemann, E., 1963, Lokalverbreingskarten charakterischer Pflanzenart im Querschnitt durch den Mittleren Thüringer Wald, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **12**, 678-694. Notes on some of the species characteristic of woodlands in mid Germany.—[D.H.K.]

Opravil, E., 1967, Die Südmahrischen Wälder im Jugereren Holozän, *Prír. Prace Úst. Cesk. Akad. Brné, Nove Sér.*, **1**(3), 69-116.

Pacyna, A., Piekós, H. & Rajchel-Kaźmierezakowa, R., 1966, Roemeszezenic i wedrówki róslin w dolinach potoków tatrzánskich, *Fragm. Flor. geobot.*, **12**, 423-450. The distribution and migration of mountain and non-mountain plants in the valleys of the Tatra Brooks, Poland is reviewed.—[D.H.K.]

Passarge, H., 1967, Über Saumgesellschaften im nordostdeutschen Flachland, *Feddes Rep.*, **74**, 145-158.

Perring, F. H., 1967, The Irish problem, in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 257-268. Reviews and discusses the American and Lusitanian elements in the Irish flora. The American element is represented by *Najas flexilis*, *Eriocaulon septangulare*, *Hypericum canadense*, *Spiranthes romazoffiana*, *Sisyrinchium bermudiana* and *Juncus tenuis*, and the Lusitanian element by *Euphorbia peplis*, *Sibthorpia europaea*, *Pinguicula lusitanica*, *Erica vagans*, *Simethis planifolia*, *Arbutus unedo*, *Euphorbia hyberna*, *Erica hibernica* (*E. mediterranea*), *Neotinea intacta*, *Daboecia cantabrica*, *Erica mackaiana*, *Pinguicula grandiflora*, *Saxifraga hirsuta*, *S. spathularis* and *Erica ciliaris*.—[D.H.K.]

Richard, J.-L., 1966, Le forêts naturelles d'épicéas et de pins de montagne du Jura, *Bull. Soc. Neuchâtel, Sci. nat.*, **89**, 101-112. Notes on the plant associations of the Jura limestone mountains.—[D.H.K.]

Rose, F., 1965, Botany on two coasts (a comparative study of the flora of Kent and the Pas de Calais region), *New Scient.*, **27**, 158-161.

Ryvarden, L., 1967, Bidgrag til Finnmarks flora, 3, *Blyttia*, **1967**, 55-60. Additional localities are given for some of the more uncommon plants of Finnmark, northern Norway.—[D.H.K.]

Schubert, R. & Köhler, H., 1964, Vegetations kundliche Untersuchungen in der mitteldeutschen Ackerlandschaft, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Sonderheft*, **1964**, 3-51.

Solleveld, M. H. & De Mey, P., 1967, Nogmaals de adventieve florabij de werkhaven van Hellevoetsluis, *Gorteria*, **3**, 148. A second list of species found near Hellevoetsluis, prov. S. Holland on heaps of stones used for the Delta-works.—[Authors' summary].

Spence, D. N., 1967, Factors controlling the distribution of freshwater macrophytes with particular reference to the lochs of Scotland, *J. Ecol.*, **55**, 147-170.

Stöcker, G., 1962, Vorarbeit zu einer Vegetatsmonographic des Naturschutz gebietes Bodetal, 1. Offene Pflanzengesellschaften, *Wiss. Z. Martin-Luther-Univ. Halle-Witten. Math.-Nat. Reihe*, **11**, 897-936.

Suganuma, J., 1967, Phytosociological studies on the semi-natural grassland used for grazing in Japan, 2. Ecological strata in pasture vegetation, *Bot. Mag., Tokyo*, **80**, 145-160.

Trzcínska-Tacik, H., 1966, Flora i róslinnósé zwalow Krakowskich Zakladów Sodowych, *Fragm. Flor. geobot.*, **12**, 243-318. A detailed account of the flora of spoil heaps in the large soda factory at Kraków, Poland. A list of the 275 species noted there is given, with details of plant succession, possible methods of introduction, ecology and phytosociology.—[D.H.K.]

Tüxen, R., 1966, Uber nitrophile Elymus-gesellschaften an nordeuropäischen und nordjapanischen und nordamerikanischen Küsten, *Annls. Bot. Fenn.*, **3**, 358-367.

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Tüxen, R., 1967, Pflanzensoziologische Deutung interglazier Bodenprofile, in Tüxen, R. (Ed.), *Pflanzensoziologie und Palynologie*, 215-218. The correlations between woodland and heath communities and their corresponding soil profiles in Finland, Lapland and N.W. Germany are reviewed.—[D.H.K]

Vallei, F. G., 1967, 'Legeradentieven' te Harskamp, *Gorteria*, **3**, 130-131. *Linaria repens*, *Erica cinerea* and *Ulex nanus*, of which the last named species is new to the Netherlands flora, were found as aliens near the depot Harskamp (Veluwe) of the Netherlands army. It is not unlikely that they have been introduced by military cars from La Courtine (Central France), where Dutch army units have trained during several years.—[Author's summary].

Van Ooststroom, S. J. & Mennema, J., 1967, Nieuwe vondsten van zeldzame planten in Nederland hoofolzakelijk in 1966, *Gorteria*, **3,** 133-147. A list of new localities of rare and interesting species found in the Netherlands mainly during 1966.—[Authors' summary].

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Voderberg, K. & Fröde, E., 1967, Abschliebende Betrachtung der Vegetationsentwicklung auf der Insel Bock in den Jahren 1946-1966, *Feddes Rep.*, **74,** 171-176. Studies on the phytosociology of the island of Bock between 1946 and 1966.—[D.H.K.]

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Zeitz, W.-D., 1965, Vegetationskundliche Ehreburgen über den Natürlichen Bewuchs und die künstliche Bergenünung der Bergehaldd II/VI/IX und III/V des Steinkahlen II Bergwerkes Graf Bismarck in Gelsenkirchen-Buer, *Abh. Landesmus. Naturk. Munster* (*Westfalen*), **27**(2). Pp. 35.

CHROMOSOME SURVEYS

Gadella, T. W. J. & Kliphuis, E., 1966-67, Chromosome numbers of flowering plants in the Netherlands, 2, *Proc. K. ned. Akad. Wet., ser. C. Biol. & Med. Sci.*, **169,** 541-556. Chromosome numbers are given for 157 species of Dutch plants, most of which also occur in Britain: 3, *loc. cit.*, **170,** 7-20. Chromosome numbers are provided for 46 species of Dutch plants. Among the more interesting are *Eriophorum latifolium*, $2n = 58$ (material from Denmark and Schleswig Holstein has given $2n = 72$). *Mercurialis perennis*, $2n = 64$ and 66 from Limberg and $2n = 84$ from a population of female plants near Utrecht (the count of $2n = 42$ has been reported from Hungary). *Sedum acre*, $2n = 40$ ($2n = 16$ has been reported from Britain and $2n = 80$ from the United States). A single population of *Stellaria graminea* from near Utrecht proved to be triploid with $2n = 39$.—[D.H.K.]

Hedberg, O., 1967, Chromosome numbers of vascular plants from arctic and subarctic North America, *Ark. Bot. ser.* 2, **6**, 309-326. The following chromosome numbers are given for material cytologically examined from arctic and subarctic North America—*Triglochin maritima*, $2n = 48\pm$; *Hierochloe alpina* (Sw.) Roem. & Schult., $2n = 56$; *H. odorata* (L.) Beauv. *sensu lato.*, $2n = 70$; *Alopecurus alpinus*, $2n = c.\ 10\pm$; *Deschampsia cespitosa*, $2n = c.\ 30$-34; *Festuca rubra* L., *sensu lato.*, $2n = 49\pm$; *Hordeum jubatum*, $2n = 28$; *Eleocharis palustris*, $2n = 36\pm$; *Carex bicolor*, $2n = 52$; *C. atrofusca*, $2n = 42\pm$; *C. capillaris*, $2n = c.\ 50$; *Tofieldia pusilla*, $2n = 30$; *Cerastium alpinum* L., *sensu lato.*, $2n = 72\pm$; *Minuartia rubella*, $2n = 24$; *Silene acaulis*, $2n = 24$; *Viscaria alpina*, $2n = 24$; *Caltha palustris* L., *sensu lato.*, $2n = 60\pm$; *Cochlearia groenlandica*, $2n = 14$; *Saxifraga cernua*, $2n = c.\ 70$; *S. nivalis*, $2n = c.\ 56$; *Sibbaldia procumbens*, $2n = 14\pm$; *Astragalus alpinus*, $2n = 32$; *Arctostaphylos alpina*, $2n = 26$; *Vaccinium uliginosum* L., *sensu lato.*, $2n =$ c. $45\pm$ (probably 48); *Achillea millefolium* L., *sensu lato*, $2n = 36\pm$.—[D.H.K.]

Laane, M. M., 1966-67, Kromosom under søkelser i Øst-Finnmarks Flora, 1, *Blyttia*, **1966**, 270-276: 2, *loc. cit.*, **1967**, 45-54. Chromosome numbers are given for a number of phanerogams from the eastern part of Finnmark, northern Norway. Most of these agree with counts made by workers in other parts of Europe and North America. The following are, however, of special interest:—*Cardamine pratensis* L., *sensu stricto* $2n = 24$; *Deschampsia cespitosa*, $2n = 28$ and *Poa glauca* Vahl. subsp. *glauca*, $2n = 54$-56. The tetraploid number $2n = 36$, was found in material of *Parnassia palustris*, though the plants did not show the typical characteristics of the tetraploid subsp. *obtusifolia* (Rupr.) D. A. Webb.—[D.H.K.]

Löve, A., 1967, IOPB Chromosome reports, 9, *Taxon*, **16**, 62-66. The following chromosome numbers are reported from the U.S.A.—*Asplenium viride*, $n = 36$; *Bidens bipinnata*, $2n = 72$; *B. cernua*, $2n = 24$; *B. frondosa*, $2n = 48$ and *B. tripartita*, $2n = 48$: 10, *loc. cit.*, **16**, 146-157. A number of new chromosome counts are given, including the following from India *Pteris cretica* $2n = 87$; *P. vittata*, $n = 58$ and *Adiantum capillus-veneris*, $n = 30$. *Potentilla crantzii* from Czechoslovakia had $2n = 28$; 11, *loc. cit.*, **16**, 215-222. Chromosome numbers reported from India include *Antirrhinum majus*, $n = 8$; *Misopates orontium*, $n = 8$; *Digitalis purpurea*, $n = 28$; *Linaria bipartita*, $n = 6$; *Cymbalaria muralis*, $n = 7$; *Verbascum thapsus*, $n = 18$ and *Veronica anagallis-aquatica*, $n = 27$; 12, *loc. cit.*, **16**, 341-350, Chromosome numbers reported from India include *Galinsoga parviflora*, $n = 8$; *Sigesbeckia orientalis* L., $n = 12$ and *Sonchus asper*, $n = 9$. *Agrostis scabra* Willd. var. *scabra* from the United States had $n = 21$.—[D.H.K.]

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HISTORICAL

Baer, M. E. & **Anderson**, E., 1966, The Chelsea Physic Garden, yesterday and today, *Bull. Mo. bot. Gdn.*, **54**(3), 20-23.

Cave, R. & **Wakeman**, G., 1967, *Typographia Naturalis*. Pp. 36. Brewhouse Press, Wymondham, Norfolk. Price 63/-. A short survey and history of nature printing with illustrations of leaves, etc., from various early and historical publications.—[D.H.K.]

Crackles, E., 1967, Some plant records by Robert Teesdale with special reference to the East Yorkshire Flora, *Naturalist*, **1967**, 37-47. A review of various East Yorkshire species recorded by the eighteenth century botanist Robert Teesdale (d. 1804) and their present distribution in the area.—[D.H.K.]

Currey, J. E. D. (Ed.), 1967, *Reflections on the colony of New South Wales; George Caley Explorer and Natural History Collector for Sir Joseph Banks*. Pp. xv + 239. Angus and Robertson, London. Price 50/-. A collection of letters, notes, etc., written by George Caley (*c*. 1770-1829), a Yorkshireman who was sent to New South Wales by Sir Joseph Banks in 1800 to collect specimens for Kew and for Banks's private collection. The book contains interesting chapters on Sir Joseph Banks (1743-1820) and the 'notorious' William Bligh (1754-1817).—[D.H.K.]

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Allan, M., 1967, Sir Joseph Dalton Hooker, O.M., G.S.C.I. (1817-1911), *Gdnrs' Chron.*, **161**(23), 20 & 25.

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Iltis, H., 1966, *Life of Mendel*, Translated by E. & C. Paul. Pp. 336 + 12 plates. London. 1932: Second impression, London.

Joahn, I., 1966, Carl Ludwig Willdenow and die Biologie seiner zeit., *Wiss. Z. Humboldt-Univ. Berlin*, **15**, 803-812. C. L. Willdenow (1765-1812) whose 200th birthday was commemorated in 1965 held the first chair of botany at Berlin University after its formation. This appointment crowned his whole work which reflects the struggle of botany at that time for emancipation from medicine and recognition as an independent discipline of science. The success of these efforts was due also to Willdenow's personality. He dealt in a masterly and practical way with the scientific problems of his time, raised them to higher levels, and impressed the public by his great organizing capability. Unpublished sources give an insight into many aspects of Willdenow's activities as university teacher and director of the Botanical Gardens. These activities were marked by his early friendship with Alexander von Humboldt and the knowledge of this interplay permits many new interpretations. —[Author's summary]

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WEBER, W. A., 1965, Theodore Dru Alison Cockerell, 1866-1948, *Univ. Colo. Stud. Ser. Bibliography*, **1**, Pp. 124. A bio-bibliography of T. D. A. Cockerell an all round naturalist, who between 1882 and 1948 produced no less than 3,904 papers published in 221 different periodicals. A complete list of the papers, some of which are on British plants, is given.—[D.H.K.]

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CLASSIFICATION, NOMENCLATURE AND BOTANICAL TERMINOLOGY

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Delvosalle, L., 1967, Clés pour la détermination des plantes ligneuses en hiver. *Naturalistes belg*., **48,** 82-124. A key is given for the identification of trees and shrubs by characteristics of twigs and buds.—[D.H.K.]

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The term polyploidy is defined and is followed by an examination of polyploids in nature, in particular the accidental appearance of polyploid individuals in a population as against the inception of a polyploid race. The latter may be due to a number of causes, e.g. climatic, geographical disturbances, etc. Comparisons of respective areas of corresponding diploid and polyploid taxa are made, the area occupied by the latter invariably differs from that of the diploid taxon or taxa from which it is derived. Detailed studies are made on chromosome races, and the importance of cytogeography and cytoecology to historical plant geography is stressed.—[D.H.K.]

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Korf, R. P. & Rogers, J. K., 1967, A new term, the schizophyte, and the concept of implicit typification, *Taxon*, **16,** 19-23.

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McVaugh, R. (Secretary), 1967, Report of the Committee for Spermatophyta: Conservation of Generic Names, 7, *Taxon*, **16,** 226-229. Among genera recommended for conservation is *Filago* L.—[D.H.K.]

Morton, C. V., 1967, On the publication of names by means of illustration with analyses, *Taxon*, **16,** 119-121.

Rauschert, S., 1966, Ist Barbarea Ehrhart ein legitimer Gattungsname?, *Feddes Rep.*, **73**, 222-225. *Barbarea* R. Br. (1812) is a homonym of *Barbarea* Scop. (1760), and the earliest available name for the genus is *Campe* Dulac (1867), unless the generic name *Barbarea* is conserved the correct names for the British species will be: *Campe barbarea* (L.) W. F. Wight ex Piper (*Barbarea vulgaris* R.Br.), *C. barbarea* subsp. *arcuata* (Opiz) Rauschert, comb. nov., *C. stricta* (Andrz.) W. F. Wight ex Piper (*B. stricta* Andrz. ex Bess.), *C. verna* (Mill.) A. A. Heller (*B. verna* Mill.) and *C. intermedia* (Bor.) Rauschert, comb. nov. (*B. intermedia* Bor.).—[D.H.K.]

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Terrell, E., 1967, Meadow Fescue: Festuca elatior L. or F. pratensis Hudson, *Brittonia*, **19**, 129-132. The grass commonly called 'meadow fescue' is known in the United States as *Festuca elatior* L. and in Europe as *F. pratensis* Hudson. Study of the literature and type specimen shows that the name *F. elatior* is ambiguous and confused. The earliest correctly applied name is *F. pratensis* Hudson, hence it should be universally adopted.—[Author's summary]

Webb, D. A., 1967, Generic limits in European Lythraceae, *Feddes Rep.*, **74**, 10-13. The European genera of Lythraceae are reviewed and it is concluded that *Peplis* is not a valid genus but is best placed under *Lythrum. Peplis portula* is accordingly transferred to **Lythrum portula** (L.) D. A. Webb, comb. nov.—[D.H.K.]

Webb, D. A., 1967, Short Notulae: Rosaceae, *Feddes Rep.*, **74**, 24. The correct name of the almond if retained under *Prunus* is shown to be **P. dulcis** (Mill.) D. A. Webb, comb. nov., not *P. amygdalus* Batsch. The Linnean name *Amygdalus communis* is, however, valid if the species is retained under that genus.—[D.H.K.]

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Denaeyer-De Smet, S., 1966, Note sur les relations chimiques chez Buxus sempervirens L. et Pinus sylvestris L. dans les Alpes Maritimes, *Bull. Soc. r. Bot. Belg.*, **99**, 221-226. Whatever the nature of the soil in which *Buxus sempervirens* and *Pinus sylvestris* grow, the chemical composition of the leaves and branches of one year scarcely varies.—[Author's summary, translated by E.B.B.]

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Relations between phases and radiant energy distribution through the year and habitat temperature are discussed.—[Author's summary].

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OBITUARY

DR F. R. ELLISTON WRIGHT

Dr Frederick Robert Elliston Wright, who died on 6th August, 1966, at the age of 87, was in general practice at Braunton, N. Devon, for more than half a century. When he was a young man medical teaching placed great emphasis on an understanding of plant life and its properties, and these early researches laid the foundations for what was to become a life long study of natural history.

Dr Elliston Wright was one of the diminishing band of genuine nature-lovers with a first-class knowledge ranging over many fields of natural history and with an intense interest in the form and modes of life of organisms of all kinds, but notably flowering plants, fungi, insects and birds. His success as a naturalist stemmed mainly from his accurate and astute observation—he had a keen taxonomic 'sense'—and his appreciation of the importance of seasonal behaviour, effect of environment and the associations between organisms. It was as a botanist that he made most of his scientific contributions and he was never happier than when searching for plants, observing their behaviour when cultured in his garden and studying the insects peculiar to certain plants. He believed that more could be learnt from looking at organisms in their natural habitats than could ever be gained from books and he preferred to leave plants growing than to collect them for herbaria—'as they will do more good where they belong'.

Much of his published work relates to the large sand-dune system of Braunton Burrows, on which he was an authority both on the flora and fauna, and to which he led a party from the Vth International Botanical Congress in 1930. His frequent visits to the Burrows over many years yielded numerous plant records, given in his book on Braunton, the *Flora of Devon* and the *Reports and Transactions of the Devonshire Association.* Among his photographs in these Transactions of plants from the Burrows are *Anagallis minima* (*Centunculus minimus*) (1951) and a dune form of *Sagina nodosa* (1956). He was the finder of *Rumex* × *wrightii*, believed derived from *R. frutescens* and *R. conglomeratus*, named for him by J. E. Lousley (*Watsonia*, **2**, 394 (1953)) and known only from Braunton Burrows. More recently he has reported *Conyza canadensis* × *Erigeron acer* and *Pyrola rotundifolia* from the dune system.

The genus *Sagina* held a special interest for him; he collected and cultivated many forms, some from Scotland but most from his favourite localities in Devon. A series of well illustrated papers record his findings. Also of particular interest to him was the flora of Lundy island, of which he had unrivalled knowledge, recognised by his election to Honorary Membership of the Lundy Field Society. His discerning eye led to the discovery of the Lundy Cabbage, *Rhynchosinapis wrightii* (*Brassicella wrightii*), endemic to the island, and named for him by Professor O. E. Schulz. The extensive and careful study of all parts of the plant (e.g. detail of the venation of the valves of the siliqua) was typical of Dr Wright's approach; these observations and the realisation that the crucifer is the sole and special host of two beetles, peculiar to the habitat, provided evidence that this taxon is of specific rank and considerable antiquity.

Although his work on insects was less wide than his botanical studies, his notes on local moths and caterpillars further demonstrate his powers of observation and his readiness to experiment. The description, for instance, of how the males of the Northern Eggar Moth (*Lasiocampa quercus callunae*) were attracted to a female in a muslin bag which he placed in his garden, and his observations on sensory communication in insects, make fine reading.

Likewise with birds the check-list and notes on status and behaviour have provided invaluable data for assessing subsequent changes in populations.

Dr Elliston Wright lived to see the southern half of Braunton Burrows become a National Nature Reserve, a distinction which his records did much to bring about. He was a foundation member of the Devon Trust for Nature Conservation and to the younger members of this comparatively new and thriving society his work will continue to be both a guide and an inspiration.

Those who knew Dr Wright came to appreciate his fund of information, his unassuming modesty, and more especially his sense of humour, a distinctive amalgam savouring slightly of mischief but mainly of kindliness.

PRINCIPAL PUBLICATIONS

1926

Braunton: A few nature notes: with lists of flora, macrolepidoptera and birds known to occur in the district. (Revised ed. 1932). Barnstaple.

1930

Braunton Burrows, pp. 1-4. Barnstaple.

1932

(with F. A. Brokenshire and R. Taylor) *The North Devon Plant List.* Barnstaple.

1933

Alterations in vegetative growth due to environmental adaptation in Braunton Burrows. *Rep. botl Soc. Exch. Club Br. Isl.*, **10**, 258-267 (45 plates).

Contribution to the flora of Lundy Island. *J. Bot., Lond.*, **71**, (Suppl.), 1-11 (6 plates).

1935

On the origin of Lundy flora, with some additions. *J. Bot., Lond.*, **73**, 90-95.

Notes on the North Devon Saginas. *J. Bot., Lond.*, **73**, (Suppl.), 1-12 (24 plates).

1936

The Lundy *Brassica*, with some additions. *J. Bot., Lond.*, **74**, (Suppl.), 1-8 (17 plates).

1938

Notes on two Saginas. *J. Bot., Lond.*, **76**, 361-364 (1 plate + 1 text-fig.).

Note on the Scottish Saginas. *J. Bot., Lond.*, **76**, (Suppl.), 1-8 (15 plates + 2 text-figs.).

1939

Note on the relation of venation to leaf form in angiosperms. *School Nature Study*, **34**, No. 134, 12-17 (3 plates).

Ecological Studies. Braunton Burrows. In *Flora of Devon*, ed. W. K. Martin & G. T. Fraser, pp. 19-26. Arbroath.

1940

Sagina maxima Gray and *Sagina sinensis* Hance. *J. Bot., Lond.*, **78**, 37-39 (3 plates).

1948

Note on *Sagina procumbens* var. *Daviesii* (Druce) Druce. *Rep. botl Soc. Exch. Club Br. Isl.*, **13**, 324-326 (1 plate).

Notes on growth form of tall rush-like plants in Braunton Burrows. *NWest. Nat.*, **23**, 15-19 (5 plates).

1953

Note on the dispersal of *Sagina nodosa* var. *moniliformis* Lange. *Watsonia*, **2**, 369-370 (1 plate).

1960

Note on *Holoschoenus vulgaris*. *Rep. Trans. Devon. Ass. Advmt Sci.*, **92**, 366 (2 plates).

1962

Change in vegetation of Braunton Burrows. *Rep. Trans. Devon. Ass. Advmt Sci.*, **94**, 144-145.

1964

Juncus acutus on Braunton Burrows. *Rep. Trans. Devon. Ass. Advmt Sci.*, **96**, 85-86.

—A. J. WILLIS and J. COLEMAN-COOKE

REPORTS

ANNUAL GENERAL MEETING, 29th APRIL, 1967

The Annual General Meeting of the Society was held at Monks Wood Experimental Station, Abbots Ripton, Huntingdonshire, on Saturday, 29th April, 1967, at 12 noon.

Mr E. Milne-Redhead (Vice-President) was in the Chair and 63 members were present.

The Minutes of the last Annual General Meeting, as printed in *Proceedings*, Vol. 6, Part 3, pages 293-4, were adopted.

REPORT OF COUNCIL

The Report together with the Accounts for the year 1966 had been circulated to all members. There being no queries, the Report was adopted on the motion of Dr S. M. Walters, seconded by Mrs M. Briggs.

ELECTION OF PRESIDENT

Dr J. G. Dony had been nominated by Council. The Chairman said that Dr Dony had been successively Honorary Field Secretary and Honorary General Secretary for a considerable number of years and in these capacities had helped to steer the Society through a period of great growth. He had become well-known to the membership as a whole. His friendliness and assistance were bywords and his presence in the field was a tonic. There could be no more worthy person to fill the Presidency and he proposed from the Chair that Dr Dony be elected. The proposal was carried with acclamation.

Dr Dony thanked the Meeting for the honour accorded him. He then took the Chair.

A vote of thanks was given to Dr C. E. Hubbard, the senior Vice-President, for having so ably shouldered the duties of the Presidency following Dr E. F. Warburg's death while in office.

A proposal by Mrs B. H. S. Russell, seconded by Mr Milne-Redhead, that a letter be sent to Mrs Warburg from the Annual General Meeting expressing the keen sense of loss felt by members as a whole was warmly approved.

ELECTION OF OFFICERS

Dr Hubbard retired as a Vice-President under Rule 9 and a further vacancy had been created by the election of Dr Dony as President. Council had nominated Miss U. K. Duncan and Professor J. G. Hawkes to fill the vacancies and their elections, proposed from the Chair, were carried unanimously.

Mr. E. B. Bangerter, having nobly filled the breach as Honorary General Secretary for two years, had now indicated his wish to retire. The President expressed thanks to him on behalf of the Society. Mr D. E. Allen had been nominated by Council to take his place. His election was proposed from the Chair and carried unanimously.

In thanking the Meeting, Mr Allen said that over the last year or two he had become far from unaware of the great complexities of the office into which he was stepping. He regarded himself as singularly fortunate, therefore, that his three predecessors were all still actively concerned with the Society's affairs and that he would be able to call upon them for their help and advice.

Mr J. C. Gardiner had been nominated by Council for re-election as Honorary Treasurer, Dr M. C. F. Proctor as Honorary Editor of *Watsonia*, Mr E. F. Greenwood as Honorary Editor of *Proceedings* and Mrs M. Briggs as Honorary Meetings Secretary. The re-election of all these Officers was proposed from the Chair and carried unanimously. The President thanked them for all the valuable work they had done for the Society in the past year.

Mr. P. C. Hall had indicated his wish to resign as Honorary Field Secretary after eleven years in office. He was formally thanked for the very great amount of work he had put in over this long period on the Society's behalf. There were no nominations for the vacancy and Council had been unsuccessful in finding anyone willing to succeed to this onerous office. As a possibly interim measure, therefore, it has been decided to recommend that a new office, Honorary Assistant Secretary (Programme), be created, the holder of which, it was proposed, would combine the handling of a more limited aspect of the field programme with the collecting together of all the varied details required for the annual Calendar. In the last two years support for field meetings had sharply declined to the extent that several had had to be cancelled; a reduction in their number in the current season, decided on as an experiment, would mean a considerable easing in any case of the administrative burden. This solution was agreed to without dissent.

ELECTION OF NEW MEMBERS TO COUNCIL

In accordance with Rule 10 Mr J. Ounsted, Mr A. C. Jermy and Dr R. M. Harley retired and a fourth vacancy had been created by the election of Mr Allen as Honorary General Secretary. The President expressed the Society's thanks to the retiring members for their services. Four nominations only had been received: Prof V. H. Heywood, Mrs B. H. S. Russell, Dr H. J. M. Bowen and Mr J. F. M. Cannon. A ballot accordingly being unnecessary, these were elected on a show of hands, their seniority for purposes of Rule 10 being decided (in the order shown above) by lots drawn by the President.

ELECTION OF HONORARY MEMBERS

The election of Mr Bangerter and Mr Hall as Honorary Members was proposed by Council. The President said that Honorary Members fell into two categories: pre-eminent foreign or British botanists whom the Society wished to honour or, alternatively, people who had done great service to the Society. Both the proposed members fell into the latter category. Mr Bangerter had been an Officer of the Society for only a year or two but over a much longer period he had done a tremendous amount of invaluable work in the background in connection with the Society's publications. Mr Hall had not only arranged the Society's field meetings for eleven years, but had also given them his personal attention to the extent of being present at well over half of them each year. The election of both as Honorary Members was proposed by Mrs G. Crompton, seconded by Mrs Briggs and carried unanimously.

Mr Bangerter and Mr Hall expressed their appreciation of the honour accorded them.

ELECTION OF HONORARY AUDITORS

Council recommended the re-election of Messrs Price, Waterhouse & Co., who had kindly agreed to continue this work on an honorary basis. Their election was duly carried and the President expressed the Society's gratitude for their services.

ANY OTHER BUSINESS

The Honorary General Secretary reported that during the past year a notable step had been taken in arranging to hand over to the Institute of Biology a certain amount of the Society's routine clerical work on a fee basis. The burden on the honorary officers had now become so great as a result of the steady expansion of activities and membership that a move of this nature had been rendered inevitable. It was intended that over a period of years more and more of the clerical work should be gradually transferred outside and be paid for. The Institute of Biology was believed to be particularly suitable for this purpose, and its partial assumption of the administrative load from now on would be a guarantee that the Society would continue to function smoothly even in the absence or indisposition of one or more of its principal Officers.

Mr Bangerter said that a member who was unable to be present had asked him to raise the suggestion that the Society should rename itself the 'Royal Botanical Society'. The Honorary General Secretary replied that this proposal was by no means a new one. The standing objections were that the Society had by now become thoroughly well known as 'The B.S.B.I.' and that such a move might well be considered presumptuous on the part of a body that confined its attentions only to certain aspects of botany and only to the flowering plants and ferns of the British Isles. It was also pointed out that applying for a Royal Charter tended to be extremely costly. The matter was referred to Council for further consideration.

At the request of the President, Mr Greenwood described the new format of *Proceedings* that would be introduced with Volume 7, coinciding with the use of a new firm of printers. Contributions of papers or notes from members would be very welcome.

Mr Wanstall, Honorary Secretary of the Publications Committee, reported that during the past year Council had appointed two further Editors of *Watsonia* to assist Dr Proctor. These were Dr C. D. K. Cook and Dr N. K. B. Robson. It was hoped that the right time-table of publication of this journal would be speedily regained.

Mr Hall emphasised that the current reduction in the field programme did not mean that Council wished to play down or even abandon this side of its activities. The long-term hope was that the Society's Regions would increasingly organise their own field meetings, so that in time the Meetings Committee would merely be left with a co-ordinating role. Suggestions for field meetings, preferably with an offer to lead, should from now on be sent to the Honorary Meetings Secretary, Mrs Briggs. The Honorary General Secretary added that the Society's efforts in this direction were perhaps less indispensable now than previously: the Wild Flower Society now ran its own very popular programme of field meetings and many other members now found their needs amply catered for by their county naturalists' trust or by the committees active in connection with some of the forty or so county Floras currently in preparation. At the same time it had to be admitted that the completion of the Distribution Maps Scheme had resulted in a certain loss of direction in the planning of field meetings in the last few years. To try to counter this, plans were being made for a regular programme of nation-wide co-operative enquiries of the kind long carried out by ornithologists.

The President thanked these Officers for their remarks and, there being no further business, declared the meeting closed at 12.48 p.m.

D.E.A.
J.F.H.

REPORT OF THE WELSH REGION AUTUMN MEETING, 1967

The Autumn Meeting was held at the University College of Wales, Swansea, on the 23rd and 24th September, 1967. It was attended by 16 at the morning session, 17 in the afternoon and 12 on the excursion on the 24th. The theme of the meeting was 'The plant and its environment'. The guest speaker was Dr Mary Gilham, Staff Tutor in Biological Sciences at the Department of Extra Mural Studies of the University College of South Wales and Monmouthshire, and her subject was the behaviour of maritime plants in different latitudes. She dwelt mainly with the difference in plants of southern and northern Britain and showed with splendid slides how at Loch Sunart in the Western Highlands such fresh water marsh species as *Iris pseudacorus* grow abundantly in the upper salt-marsh, and deciduous woodland in sheltered places descends to sea level. Still farther north arctic-alpines are found at sea level. The effect of the cooler climate and greater rainfall in high latitudes is also shown in seabird colonies where the vegetation does not differ from that of similar ground not subjected to guano whereas on the west coast of England and Wales they have a distinct nitrophilous and salt tolerant flora. She spoke briefly of coastal communities in more southern and arid conditions, and pointed out that in the southern hemisphere evergreen woodland reaches the seaboard in both tropical and cold temperate regions.

G. T. Goodman spoke of the plant and its environment under the extremely adverse conditions of land rendered sterile by industrial waste. His talk was an introduction to the excursion which he led in the afternoon to the Lower Swansea Valley where he is involved in the research project which the University College is undertaking to find out how the area can be restored. The waste-tips which cover the valley floor are mainly of steel, copper and zinc wastes. Among them are pools and marshes where drainage water has been ponded by the tips. Other features are derelict works, ruins, tips from which hardcore is extracted and scrap yards. The Project recommends the use of the area partly for housing, partly for industry and to be served by a new main road. It is considered necessary to re-vegetate some of the area to stimulate industrial re-development, to cover roadside verges and factory surrounds and to create domestic gardens and parks. Experiments are being carried out by the Project's biological section to find an inexpensive method of neutralising the poisoning effect of the wastes of which zinc waste is the most toxic. Various grasses are sown in plots treated with organic matter, such as sewage sludge and domestic refuse, or lime. The use of varieties of grass found wild on old mining spoils which have developed inherited tolerance to normal lethal levels of poisonous metals is likely to be the least expensive procedure. A hillock of boulder clay which had been polluted by former smelter smoke before treatment now carries a plantation of Japanese Larch and Lodgepole Pine planted in 1962/63 and 63/64 which is establishing well. The marshy areas carry flourishing *Iris pseudacorus*, *Equisetum fluviatile* and other marsh plants in spite of the fact that the level of toxicity of the water is such that in cultivation the same species at the same level fail completely. On the undisturbed parts of old waste a number of species occur, notably *Diplotaxis tenuifolius*, *Linaria repens*, *L. vulgaris* and *Buddleja davidii*. A patch of the hybrid *Linaria* × *sepium* was seen.

The evening was spent in judging the photographic competition. There were 98 colour transparencies showing close-ups of plants in Class 1. The first prize was awarded to Dr W. W. Mapleson for an outstanding study of *Ranunculus omiophyllus* (*R. lenormondii*) growing in a roadside ditch at Little Haven, Pembrokeshire and the second prize to Dr C. Lynn Perry for a beautiful picture of *Asplenium marinum* at Renny Slip, Marloes, Pembrokeshire. Class 2 for a 10 × 8 inch black and white print of a close-up produced 14 entries: the winner was David Davies for a photograph of *Ophrys apifera* on Towyn Burrows, Carmarthenshire. There were only four entries in Class 3 for a 10 × 8 inch print of a habitat or plant association none of which were judged quite worthy of a prize.

On the 24th G. T. Goodman led an excursion first to an interesting salt-marsh on the Gower's north coast where, in the upper part, several plants characteristic of fresh water marshes were associated with species typical of this habitat. Here *Althaea officinalis* grows abundantly and in a small brackish pool *Zannichellia palustris* was found in fruit. The rest of the day was spent in the Whiteford Burrows National Nature Reserve owned by the National Trust. It is an extensive dune system with a rich flora. In the slacks *Ophioglossum vulgatum*, *Gentianella amarella*, *Liparis loeselii* and much *Carex serotina* were seen. Small plants which require an open habitat may benefit from grazing by ponies. A severe gale early in the month had obliterated the incipient fore-dune being built by *Agropyron junceiforme* along the greater part of two miles of the west coast and the base of the main fore-dune had been severely eroded. A very fine group of *Polypodium australe* was seen on a wall at Cwm Ivy, Llanmadoc.

—T. A. W. Davis.

FIELD MEETINGS 1967

ENGLAND

GOSS MOOR, CORNWALL. 24TH JUNE (JUNIOR MEETING)

About twenty-five people, of whom about half were sixth formers, met during a severe rainstorm in the middle of the moor. The weather, however, soon improved and most of the plants of the locality were found. The Goss Moor is a large lowland bog with a flora which includes the typical plants of such habitats as well as several unusual species. Thus there was plenty to interest the more advanced members of the party whilst the beginners were getting to know the more common species.

—AILSA BURNS.

THE CHILTERNS. 7TH-14TH JULY (JUNIOR MEETING)

This meeting, which was favoured with excellent weather, was attended by twelve junior members.

The first half of the week was based at Ivinghoe Youth Hostel, where on the evening of our arrival Dr Dony gave a most interesting illustrated talk on the flowers of the Chilterns, to which everyone in the hostel was invited.

The first day was spent at Stubbings Wood and Dancers End Nature Reserve; among the plants found were Narrow-lipped Helleborine (*Epipactis leptochila*) and Wintergreen (*Pyrola minor*). During a visit to Tring Reservoirs Nature Reserve and the Grand Union Canal, Bog Pimpernel (*Anagallis tenella*), Flowering Rush (*Butomus umbellatus*), Saracen's Woundwort (*Senecio fluviatilis*) and a large variety of aquatic plants were found.

Other members joined the party on occasional days, and were present when Ivinghoe Beacon and the Ashridge Estate were visited. There Deadly Nightshade (*Atropa belladonna*), Frog, Bee, and Pyramidal Orchids (*Coeloglossum viride*, *Ophrys apifera*, *Anacamptis pyramidalis*) were seen.

The second part of the week was spent at Lee Gate Hostel in the southern part of the Chilterns. A whole day was devoted to visiting Aston Rowant Nature Reserve in Oxfordshire, where various experiments had been made to discover the effect that grazing sheep had on plant life.

For the final walk on Friday we visited Chesham and noted the wide variety of flowers that managed to flourish on a rubbish dump. These included Hemlock (*Conium maculatum*), Melilot (*Melilotus* sp.), White Bryony (*Bryonia dioica*) and Russian Comfrey (*Symphytum* × *uplandicum*). After lunch in the Chess Valley the marshy land by the river was explored where marsh orchids were found as well as other plants commonly found in that habitat.

And so to the end of our week, with a vote of thanks to our Leaders, Dr and Mrs J. G. Dony and Mr P. Knipe and all those senior members who gave their time to make the excursion so pleasurable and instructive.—ANN C. PARKS.

THE LUNE VALLEY, LANCASHIRE. 15TH-16TH JULY

Fifteen members and friends met at Hornby on each day of the meeting. The purpose of the meeting was to explore little visited areas of Lancashire in connection with the present survey of the flora.

On the first day the party formed two groups. One group explored the marshy ground and land adjacent to the R. Lune and recorded over 200 species in each of the two tetrads examined. The other group explored only one tetrad in torrential rain on Leck Fell. A total of 158 species was recorded but most of these were found on the limestone rocks in Ease Gill and in the pot holes on the fell.

On the second day useful work was done by the whole party when the wooded banks of the R. Lune were visited at Caton and Aughton.

The meeting found no especially rare species but performed useful recording in a variety of habitats.—E. F. Greenwood.

SCOTLAND

STRANRAER, WIGTOWNSHIRE. 3RD AND 4TH JUNE

Nine members and friends met at Stranraer on Saturday, 3rd June, in good weather and explored first a sample stretch of coast at Luce Bay containing both rare and characteristic plants and secondly a part of Torrs Warren. On the Sunday morning the Mull of Galloway was visited. Three of the party were practised recorders and cards for the three areas were sent to Monks Wood. Mr T. Huxley of the Nature Conservancy attended the meeting and was sent a copy of the botanical records.—Miss J. McClure.

CARRIBBER GLEN. 10TH JUNE

A small party explored the West Lothian bank of the River Avon from Linlithgow Bridge to Torphichen Bridge. This stream is the boundary between West Lothian and Stirlingside. Although badly polluted by effluents from a paper mill, its banks, in a number of places, are quite unspoilt. Carribber Glen is the finest stretch, being well wooded and containing a varied community of plants, both woodland and marsh, among which are *Caltha palustris*, *Cardamine amara*, *Circaea lutetiana*, *Crepis paludosa*, *Doronicum pardalianches*, *Geranum lucidum* (castle ruins), *G. pratense*, *G. sylvaticum*, *Lysimachia nemorum*, *Melica uniflora*, *Sanicula europaea*. The Nature Conservancy have now made this glen an S.S.S.I.—E. P. Beattie.

ABERLADY BAY. 11TH JUNE

A large party visited Aberlady Bay and helped with the preparation of a habitat list of species which is required in connection with a management plan for this East Lothian County Nature Reserve. Two plants hitherto undetected were *Saxifraga granulata* in small quantity and a small colony of *Pilosella flagellaris* subsp. *flagellaris*. 350 species have now been found in this small Reserve. Other interesting finds were *Cirsium heterophyllum* and *Glaucium flavum*. *Blysmus rufus* is abundant but no *Blysmus compressus* could be found.—E. P. Beattie.

ISLE OF COLL. 21ST TO 28TH JUNE

As cars could not be landed on the island owing to alterations to the pier our six members had to put up with a rather shaky hired car, but this could be dispensed with on June 21st when we explored the Arinagour area in an attempt to add records to the already well-worked grid sq. 17/25. (One of our additions was *Lamium molucellifolium*). June 22nd was spent in 17/15, starting with Crossapol Bay where the dune flora was at its best, including *Thalictrum minus* subsp. *arenarium*, *Draba incana*, *Viola tricolor* subsp. *curtisii*, *Geranium sanguineum*, *Saxifraga tridactylites*, *Anagallis tenella*, and quantities of *Anacamptis pyramidalis*. A shallow pool gave us *Ranunculus aquatilis* var. *submersus* and *R. baudotii*, and we ended up in Feall Bay with the best find of the day, *Erodium glutinosum*.†

On June 23rd we returned to 17/15, finding *Polypodium interjectum*† on Ben Hogh (Coll's highest hill, 339 ft) and *Ligusticum scoticum* in Hogh Bay. The loch at Ballyhaugh had a flora typical of the island's peaty lochs, with *Myriophyllum alterniflorum*. *Apium inundatum*, *Potamogeton gramineus*, *P. natans*, *Baldellia ranunculoides*, *Sparganium minimum*,† *Scirpus fluitans* and *Dactylorhiza incarnata* subsp. *coccinea*. We visited Loch Cliad and Loch an Duin, in 17/25, on June 24th but failed to find *Sisyrhynchium angustifolium* in its classic locality, the area being closely grazed by sheep.

Loch Cliad gave us *Isoetes setacea* (*I. echinospora*), *Polypodium vulgare*, *s.s.*, *Lobelia dortmanna*, *Potamogeton perfoliatus* and *Carex serotina*, and Loch an Duin *Cladium maricus* and a single plant of *Ajuga pyramidalis*. On June 25th we found fertile *Ophioglossum vulgatum* at Arinthluic, *Isoetes setacea* (*I. echinospora*) and *Sparganium angustifolium* at Loch Arigh, and *Dryopteris* on Meall Bhreide, all in 17/25. Later, *Hymenophyllum wilsonii* was re-found in Grishipoll Bay, and *Mimulus cupreus* × *guttatus*† discovered there in a small stream (both in 17/15), while *Botrychium* and *Ophioglossum* (formerly believed to be rather rare in the island) were seen in the same bay, in 17/16.

Our most interesting day was June 26th, spent in the Sorisdale area (17/26). Orchids were numerous, particularly near Cornaigbeg where a fence kept out the sheep, among them were *Dactylorhiza maculata* subsp. *ericetorum* × *purpurella* and *Gymnadenia conopsea* subsp. *densiflora*†. Some plants of *Silene alba*† in a hayfield were hailed with joy as being possibly 'new'. On June 27th, Loch a' Mhill Aird and Loch na Cloiche (17/26) were found to be rather rich, the former with *Eriocaulon septangulare* in plenty, while *Polystichum aculeatum*†, *Utricularia intermedia* and *U. minor* grew near by; the latter with *Sparganium angustifolium* and *Cladium*. *Osmunda* was frequent where the sheep could not reach it. June 28th was a shocking day, but we returned to Crossapol Bay, where *Ranunculus trichophyllus* and *Potamogeton gramineus* were dredged from Loch a' Chuirn in rain and wind, and *Dactylorhiza maculata* subsp. *ericetorum* × *D. fuchsii*, *D. incarnata* subsp. *incarnata* and subsp. *coccinea*, and *Blysmus rufus* were seen near Caoles.

Nearly all the plants recorded by Heslop Harrison (*Proc. Univ. Durham Phil. Soc.* **10**, 4, (1941)) were seen, with the exception of *Spiranthes romanzoffiana*, *Trifolium fragiferum* and some late-flowering plants. The species marked with a dagger in the present account may be new to Coll, as it has not been possible to trace previous records.—URSULA K. DUNCAN.

DUMBARNIE LINKS, FIFE. 24TH JUNE

A group comprising 15 members of the C.S.S.F. and the Fife Branch of the Scottish Wildlife Trust visited Dumbarnie Links under the leadership of Mr G. H. Ballantyne. Many species were seen, some typical of duneland, incuding *Ammophila arenaria*, *Elymus arenarius*, *Agropyron junceiforme*, *Festuca rubra*, *Astragalus danicus*, *Listera ovata*, *Briza media*, *Koeleria cristata*, *Equisetum variegatum* and *Botrychium lunaria*. In the damper areas and slacks *Ophioglossum vulgatum*, subsp. *vulgatum*, *Oenanthe crocata*, *Pinguicula vulgaris*, *Dactylorhiza incarnata* and *D. purpurella*, *Schoenus nigricans*, *Eleocharis quinqueflora* and *Glyceria maxima* were observed, while in the neighbouring saltmarsh *Scirpus maritimus* and *S. tabernaemontani*, *Puccinellia maritima* and *Suaeda maritima* were found. Of special interest were some small colonies of *Antennaria dioica*, a few plants of which were first noticed in 1952; two flourishing patches of *Rosa rugosa*, another recently established species; the young leaves of *Calystegia soldanella*, first found in 1962; and the rediscovery of *Carex extensa*, last recorded almost 100 years ago.—GEORGE H. BALLANTYNE.

HAWICK. 24TH JUNE

Owing to the lack of numbers, the meeting was limited to one day when a party of 7 visited 3 mosses in the hill country to the north of Hawick. No unusual species were found but a number of additions to the flora of the 10 km grid square were made. Bryophytes were not collected.

Drinkstone Moss (Grid ref. 36488177) consisted of an extensive area of *Phragmites* surrounding patches of *Salix* scrub with a pool in the centre. *Filipendula ulmaria* was dominant at the periphery and contained scattered colonies of *Trollius europaeus*.

The small moss south of Groundistone farm (Grid ref. 36493187) contained *Carex rostrata* as the dominant species with some *Hippuris vulgaris*.

Drinkstone Hill Moss (Grid ref. 36478185) consisted of a central area of *Sphagnum*, *Calluna* and *Eriophorum* species surrounded by peaty pools with basic flushed conditions at the edges. A number of local species were present in the varied habitat.

—R. W. M. CORNER.

TOMINTOUL AND BEN AVON. 24TH-26TH JUNE

Limestone cliffs by the Builg burn 2 miles south of Inchrory were methodically worked on Saturday 24th resulting in 31 new records for the Atlas in grid 38/10. Species seen were *Vicia sylvatica*, *Potentilla tabernaemontani*, *Melica nutans* and a plant strongly resembling *Agropyron donianum* but too young for determination. By the burn was *Equisetum variegatum*, *Thalictrum alpinum*, *Tofieldia pusilla* and on a grassy slope *Meum athamanticum.*

The following day, the limestone area in the gorge of the Ceilnach Water was visited and several old records refound *Asplenium viride*, *Polystichum lonchitis*, *Saxifraga hypnoides* and *S. oppositifolia.*

The shingle of the river Avon at Delnato was also visited and a total of 62 records were made for grid square 38/11.

On 26th June, with a depleted party Ben Avon was visited, *Dryas* was seen, but not in flower, and an interesting *Taraxacum* was collected. Sixteen new records were made for grid square 38/10 making a total over the three days of 109 new records, excluding critical genera.—M. MCCALLUM WEBSTER.

LAMMERMUIR DEANS. 1ST AND 2ND JULY

Both days were spent exploring the finest but most inaccessible of all the wild Lammermuir ravines, Sheeppath Dean. Geologically the Lammermuirs consist of Silurian Greywacke, but in this area it is Old Red Sandstone Conglomerate. It is doubtful whether anyone has ever been right through Sheeppath Dean. The only way to explore it is to walk up the stream, in places obtaining foot-and-handholds from the slippery conglomerate projections. A few detours have to be made in order to avoid extremely deep pools and cuts.

In the wetter parts the dripping rocks are covered with *Cratoneuron commutatum*, *Ctenidium molluscum* and much more rarely *Hookeria lucens*. The extremely dry rocks are colonized by *Helianthemum vulgare*, *Rubus saxatilis* and *Thymus drucei*. The steep dangerous banks are covered with several species of native trees and the herb layer consists of *Asperula odorata*, *Asplenium trichomanes*, *Brachypodium sylvaticum*, *Cirsium heterophyllum*, *Crepis paludosa*, *Geranium sylvaticum*, *Geum rivale*, *Melica uniflora*, *Parnassis palustris*, *Pinguicula vulgaris*, *Polystichum aculeatum*, *Thelypteris phegopteris*, *Carpogymnia dryopteris* (*Thelypteris dryopteris*), *Viburnum opulus*, *Vicia sylvatica* and many other species. This dean will shortly become a Lothians Trust Reserve—E. P. BEATTIE.

GORDON MOSS. 17TH AND 18TH JULY

A small party attended. The Moss was divided into 4 natural divisions and the species found within each were recorded. Thus a record of distribution within the area was obtained. The Moss is of immense interest, consisting of a thick canopy of *Betula/Salix* scrub. Among the many interesting species recorded the following are worth special mention: *Angelica sylvestris*, *Ajuga reptans*, *Athyrium filix-femina*, *Callitriche stagnalis*, *Carex curta*, *C. paniculata*, *Corallorhiza trifida*, *Chrysosplenium alternifolium*, *Corydalis claviculata*, *Dactylorhiza purpurella*, *Drosera rotundifolia*, *Lapsana communis*, *Lemna minor*, *L. trisulca*, *Menyanthes trifoliata*, *Pyrola minor*, *Phalaris arundinacea*, *Phragmites communis*, *Platanthera bifolia*, *Populus tremula*, *Ranunculus flammula*, *R. lingua*, *Salix repens*, *Scrophularia nodosa*, *Saxifraga granulata*, *Valariana dioica*, *V. officinalis.* Particular mention must be made of the help given by Mr Alan Silverside of Durham University and Chris Badenoch of Penicuik.—A. CURRIE.

PEEBLESHIRE. 29TH JULY 1967

A cool grey day didn't auger well for the high ground, and it was a small party that met at the Tontine Hotel, Peebles, and set off for Talla Reservoir by car. The area generally is comparatively poor in species, although there are occasional exposures of richer rock which yield a better flora. Apart from one of these the walk up the Gameshope burn to Gameshope Loch and the dry crags beyond yielded little what was unexpected. A hybrid willow was identified later as *Salix caprea* × *atrocinerea* and there were frequent bushes of *S. phylicifolia* by the waterside. Gameshope loch yielded *Veronica scutellata* and *Carex rostrata*. Among other plants seen were: *Dryopteris abbreviata*, *Carpogymnia dryopteris* (*Thelypteris dryopteris*), *Polypodium vulgare s.s.*, *Asplenium adiantum-nigrum*, *Cryptogramma crispa*, *Antennaria dioica*, *Sanicula vulgaris*, *Corylus avellana*, *Rubus saxatilis*, *Arabis hirsuta*, *Melica nutans* and *Festuca vivipara*.

The attempt on the high ground was abandoned because of low cloud and the remainder of the day was occupied in visiting St Mary's Loch and the Megget Valley.

Scutellaria galericulata, *Salix pentandra*, *Cirsium heterophyllum*, *Luzula sylvatica* and *Rosa villosa* were among the plants seen (all in V.C. 78).—D. McCosh.

THREIPMUIR COMMON AND RESERVOIR, BALERNO, MIDLOTHIAN. 5TH AUGUST

This joint C.S.S.F/Scottish Wildlife Trust excursion was to Threipmuir Common and the western end of Threipmuir Reservoir. The small party present examined the plants and samples of the peat of the *Calluna/Eriophorum vaginatum* blanket bog of the Common.

The reservoir, which is subject to large changes of water level, submerged, when formed about 70 years ago, the southern edge of the blanket bog and a system of fields with banks, ditches and shelter belts. Around the margin of reservoir there is thus a variety of plant habitats and a number of plant species were found in them. Most noteworthy was an extensive area of *Carex rostrata* with *Carex aquatilis* at the head of the reservoir.—P. Myerscough.

SOMEWHERE IN ARGYLL. 12TH AND 13TH AUGUST

A small party of 4 spent a misty and at times unpleasantly wet day on Beinn Buidhe. We parked the car at the end of the Glen Shira road, and climbed Stac a Chuirn from which we went on to the summit, and to some rich cliffs immediately to the north. The most interesting plants were *Saxifraga nivalis*, *S. aizoides* (a form with reddish flowers), *Carex capillaris*, *C. saxatilis*, *Poa alpina*, *Polystichum lonchitis*, and *Cerastium alpinum*. Several *Hieracia* were collected along the course of the Brannie Burn, including *H. dewarii*. In the same watercourse *Melica nutans* and *Helictotrichon pratense* were found.

On Sunday we had an easy day and looked at various localities in South Kintyre. It was nice to see *Calystegia soldanella* near Southend, and *Typha latifolia* on the Aros Moss at Campbeltown rubbish dump was a considerable extension of range.

—A. G. Kenneth.

FERRY HILLS, FIFE. 19TH AUGUST

A small party visited the Ferry Hills which are composed of Trap. As this area, with its diverse habitats, will probably become a Reserve of the Fife Branch of the Scottish Wildlife Trust, the day was spent listing the flora. 260 species were found, the most interesting being *Astragalus danicus*, *A. glycyphyllos*, *Anaphalis margaritaceaea*, *Ornithopus perpusillus*, *Scleranthus annuus*, *Stachys arvensis* and *Thalictrum minus*. *Sambucus ebulus* and *Saponaria officinalis* were found in their old stations. A large colony of *Ligularia clivorum* was also revisited.—E. P. Beattie.

TYNNINGHAME BAY, DUNBAR, EAST LOTHIAN. 20TH AUGUST

A small party visited Tynninghame Bay and the estuary of the Tyne. A hot summer sun had dried up most of the vegetation, but it was interesting to see new colonies of *Artemisia maritima* while in a heathland area thriving colonies of *Lycopodium clavatum* were in fruit, and small scattered colonies of *Filago minima* were also seen—both these species are very rare in the Lothians. On the 'Buckthorn' spit *Anagallis arvensis* and *Hyoscyamus niger* were abundant.—E. P. BEATTIE.

LAMMERMUIR DEANS. 2ND SEPTEMBER

Owing to the long, dry summer, the vegetation on Traprain Law was so burnt up that it was decided to explore another three Lammermuir Deans instead. These ravines are also deeply cut in the Old Red Sandstone Conglomerate. Lingup is a pleasant, well wooded glen, but its vegetation is much modified by the adjacent moor. Bladdering Cleuch is a miniature Sheeppath Dean. Burnup or the Fairy Castle Dean is a dry canyon. The name is applicable both of dykes of porphyrtic trap and the shapes assumed by the weathered conglomerate. Where the habitat occurs, the species are the same as in the other deans explored.—E. P. BEATTIE.

WALES

UPPER TOWY VALLEY. 22ND APRIL

Six members and two young guests attended the meeting which was to have been a joint one with the Cotswold naturalists but unfortunately they were unable to attend. Above the sessile oakwood of Pen-rhiw-Iar, a National Nature Reserve, at about 1400 feet the leader showed how an interesting plant community, which included *Viola lutea*, *Genista tinctoria*, *Vicia orobus* and orchids, had been affected by a change of land use from farm intake to forestry plantation, the herbs being reduced, in some cases to extinction, by growth of *Molinia* and other coarse grasses. In oak and birch woodland at the Dinas, Ystradffin, magnificent bryophyte curtains on the rocks were of great interest. The site of the proposed Brianne dam was next visited and above it the Rhandirmwyn School Nature Reserve established by agreement with the Forestry Commission. Here relic pockets of *Ulmus glabra*, *Tilia cordata*, and *Populus tremula* were seen.—Leader: Mrs I. M. VAUGHAN.

LLANSTEPHAN, CARMARTHENSHIRE. 3RD JUNE

Five members attended the meeting which began with a visit to Lacques Farm. A wooded cwm descending to a shore beneath a limestone cliff was full of *Carex pendula* down as far as an incipient patch of salt-marsh. The cliff carries a rich association which includes *Rubia peregrina*, *Ligustrum vulgare* and *Rosa rubiginosa*. A veil of the moss *Cratoneuron commutatum* on the cliff face beneath a spring of calcareous water was striking. The salt-marsh of the Taf estuary at Black Scar was visited next where all other plants were being smothered by *Spartina* × *townsendii* in the lower zone. In the upper zone there are such rather local species as *Ranunculus sceleratus*, *Althaea officinalis* and *Apium graveolens*. At the point of the Scar there is much *Elocharis uniglumis*, *Carex distans*, and some *Limonium binervosum*. Just above the salt-marsh acid bog and salt tolerant species such as *Ranunculus baudotii*, *Carex otrubae* and *Carum verticillatum* meet. At Mwche Farm in a wide stretch of closely grazed salt-marsh *Alopecurus bulbosus* was frequent in the sward and in ditches three species of *Callitriche* were found. Finally to a small mixed deciduous wood of oak, beech and holly with a typical moderately base rich ground flora.—Leader: Mrs I. M. VAUGHAN.

GREAT AND LITTLE ORME, CAERNARVONSHIRE. 17TH JUNE

Fifteen attended this joint meeting with the North Wales Naturalists' Trust. On the slopes of the Great Orme *Hypochoeris maculata* and *Epipactis atrovirens* were seen within a few yards, growing with *Anacamptis pyramidalis*. *E. atrovirens* on the Great Orme is normally a plant of rock ledges and crevices but here it grows in fair quantity in short scrub. Beside a patch in Heulfre Gardens John Brummitt showed a plant of *Neottia nidus-avis*. Between the Great and Little Orme *Leonurus cardiaca* and *Erodium maritimum* were seen. On the Little Orme plants of particular interest included *Polypodium australe*, *Minuartia verna* and *Sedum forsteranum*.—Leader: M. MORRIS.

FERRYSIDE, CARMARTHENSHIRE. 24TH JUNE

Nine members and one visitor met to examine the flora of the restricted dune and salt-marsh systems of the east bank of the Towy estuary. Along the coastal road to St Ishmael *Rubia peregrina* and *Lathyrus sylvestris* grow in quantity. On the wall of St Ishmael Church there is *Sedum forsteranum*. At St Ishmael a narrow belt of mature dune is restricted from further development owing to the need to keep the railway clear. Beyond the dunes an exposed beach has been stripped of sand in the past sixteen years converting it into a rocky shore. A small sandy beach developing behind a large Old Red Sandstone rock had a good colony of *Glaucium flavum* and further on colonisation by *Agropyron junceiforme* was forming an embryo dune. An interesting maritime cliff flora on a sea wall included *Crithmum maritimum* and *Limonium binervosum*. The leader has counted the flower spikes of *Anacamptis pyramidalis* each year since 1957 in a calcareous field between the beach and the railway: 378 were counted. In the extensive salt-marsh of Morfa Uchaf dominated by *Juncus maritimus*, brackish pools at the upper edge contained *Ranunculus baudotii* with and without floating leaves and *Ruppia maritima*. At the upper limit of the marsh *Apium graveolens* and a patch of *Artemisia maritima* were seen. On a sandy track the leader showed a colony of *Trifolium ornithopodioides* in its only known county station.—Leader: R. F. MAY.

MOCHRAS, MERIONETH. 8TH JULY

A joint meeting with the West Wales Naturalists' Trust was attended by more than thirty people. Owing to illness P. M. Benoit was unable to lead the party as planned. The northern end of the Morfa Dyffryn dune system is of particular interest with the varied nature of its slacks, the transition from slack to salt-marsh at the head of the Mochras Lagoon and the sandy nature of the substratum of the marsh. It was evident from its short stems and scattered distribution that *Spartina* × *townsendii* was kept in check under these conditions. This is the best station for *Salicornia perennis* in the only Welsh county in which it occurs. In the dunes *Epipactis phyllanthes* grows in quantity and a colony of *Polygonatum multiflorum* was seen. In the slacks *Juncus acutus* is here near its northern limit. Orchids were plentiful, three species of *Dactylorhiza*, *Listera ovata* and, so characteristic of Welsh dune systems, *Epipactis palustris* were seen. In spite of the area being used for camping it suffers relatively little damage at this northern end where the density of tents and caravans is far less than in the southern part of the Morfa.—Leader: W. M. CONDRY.

DULAS VALLEY, MONTGOMERYSHIRE. 2ND SEPTEMBER

A joint meeting with the Montgomeryshire Natural History Society was attended by eleven people. The purpose of the meeting was to assess the botanical interest of the valley which is one of ten in the county under consideration for a reservoir site by the Severn River Authority. The River Dulas valley between Tylwch and Craig Tylwch is a complex of hillside, bog, riverside and disused railway embankment. The mountain side on the east bank was a magnificant sight with *Ulex gallii*, *Calluna vulgaris* and *Erica cinerea* all in full flower. Plants of rather local distribution seen in the valley included *Trollius europaeus*, *Sedum forsteranum* and *Lamium album*. The most abundant ferns were *Thelypteris limbosperma* and *Athyrium filix-femina*. Upstream the valley opens out. Among the plants particularly noted were one bush of *Rosa afzeliana* var. *glaucophylla*, *Sanguisorba officinalis* which is rare in the county and unusual forms of *Calystegia*, *Symphytum* and a *Rubus* sp. section *Suberecti*. The swiftly flowing river contained *Callitriche hamulata* and *Myriophyllum alterniflorum*.—

Leader: Miss V. J. Macnair

PERSONALIA AND NOTICES TO MEMBERS

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr Perring (address as above) include:

1. 35 mm filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards and 'Trust' Record Cards with numbers substituted by columns. Both at 15/- per hundred.
3. Individual Record Cards, price 10/- per hundred.
4. Vice-county maps (quarto size) from the *Atlas*, price 3d. each and from Collin's 'New Naturalist' price 1/- each.
5. Base maps of the British Isles with 100 km grid (quarto) and also of Ireland, and Scotland. Price 2d. each.
6. Corrections to the *Atlas of the British Flora:* free on receipt of a stamped addressed envelope.

The Centre would like to build up a collection of recording cards; if you have one designed would you please send us a copy?

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact the Hon. Archivist, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF *WATSONIA* AND *PROCEEDINGS*

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete 'runs'. The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part 5 and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

THREATS TO BRITISH FLORA

Members are urged to report to D. Streeter, School of Biological Sciences, University of Sussex, Brighton, Sussex, any threats to the British flora. The Council has appointed a Conservation Committee to deal with such matters and every effort will be made 'to promote in every way possible the conservation of the British flora'.

TOXIC SPRAY DAMAGE

Any damage due to the spraying of roadside verges with toxic chemicals should be reported immediately to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, School of Biological Sciences, University of Sussex, Brighton, Sussex), who will send a form listing the detailed information required by the Nature Conservancy. The forms have been prepared after discussions between the B.S.B.I. and the Conservancy, and when completed will be forwarded to the Conservancy who are carrying out active work on this subject.

CHALK GRASSLAND

An attempt is being made to collate all available information on chalk grassland ecology. In this connection it would be appreciated if any member engaged in or, having information on any aspect of research connected with chalk conservation, ecology or vegetation would please send details to the Secretary of the B.S.B.I. Conservation Committee (D. Streeter, School of Biological Sciences, University of Sussex, Brighton, Sussex). If this information has already been sent either to the Nature Conservancy's Research Section at Monks Wood or to the Secretariat of the County Naturalists' Trust Committee of the S.P.N.R. details are not required but only a note indicating the subject of the work.

TRANSPLANT AND INTRODUCTION EXPERIMENTS

The Secretary of the Conservation Committee (D. Streeter, School of Biological Sciences, University of Sussex, Brighton, Sussex) would be glad to hear from anyone who is carrying out any experiments involving the transplanting of species from one locality to another, or who is engaged in the introduction of species by seeds or other means. It is becoming very necessary to keep a central record of experiments of this nature, and it is hoped that this request will meet with active support. The Secretary will gladly send a short list of the information required in the recording of such experiments.

THE BRITISH MUSEUM MULL PROJECT

The Department of Botany of the British Museum (Natural History) has started a field programme in which it is intended that a floristic and descriptive ecological survey of the Island of Mull and its off-lying small islands (v.c. 103, Mid Ebudes in part) will be made during the course of the next four years. It is envisaged that the work will culminate in the production of a publication of the 'County Flora' type.

Since, unlike the authors of most county Floras, the department is equipped with staff, collection and library to deal, at least in theory, with all groups of plants, it is hoped that the final publication will be of unusually wide taxonomic coverage, covering most cryptogams, and will make a special feature of the ecological and geographical relationships of the flora.

It will be evident to those experienced in work of this kind, that the proposed programme is ambitious and represents a substantial commitment, in an entirely new field of activity, of the department's time and resources. For this reason we shall greatly welcome and appreciate offers of help from all interested persons. We have been very fortunate in gaining the active support and assistance of several Scottish botanists who are interested in the area, and we are already indebted to a number of specialists for the benefit of their expert opinions in certain critical groups.

During the last season four visits to the island, involving 16 members of the staff, have been made. This additional experience has revealed further information of great interest, especially on the cryptogamic groups in the area, which have been very little explored. We shall be very pleased to give information relating to transport, accommodation and local botany, to anyone interested in visiting the island. While its weather cannot be recommended, the scenery and interest of the area does much to outweigh this disadvantage, and Mull and the associated area can be recommended confidently to those looking for a botanical holiday away from the well trodden paths to the famous shrines. We are well aware that, limited as we are by considerations of distance and time, our work can be greatly enriched by the help of others, which would of course receive appropriate recognition in the final publication.

If you can help or would like any further information, please write in the first instance to J. F. M. Cannon or E. B. Bangerter, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

FLORA OF LEICESTERSHIRE

An autonomous committee has been formed to begin work on the preparation of a new County Flora of Leicestershire. Any offers of help in recording on a 4 square kilometre 'tetrad' basis would be greatly appreciated, and also any existing records. Communications should be addressed to the Hon. Secretary of the Leicestershire Flora Committee:

Rev. A. L. Primavesi, Ratcliffe College, Syston, Leicester, LE7 8SG.

FLORA OF V.C.104 N. EBUDES

Owing to unforeseen circumstances, R. I. Sworder much regrets that he is unable to continue with this project. Anyone who may be interested in this area is asked to get in touch with Mrs C. W. Murray, Prabost, Skeabost Bridge, Portree, Isle of Skye, who is preparing a Flora of the same area but excluding The Small Isles.

BRITISH LICHEN SOCIETY DISTRIBUTION MAPS SCHEME

Members wishing to help the British Lichen Society with their mapping scheme based on the 10 km grid square system are asked to contact the Mapping Recorder, M. R. D. Seaward, Biology Dept., Loughborough College of Education, Loughborough, Leicestershire.

VERONICA SECTION *BECCABUNGAE*

N. G. Marchant, Botany School, Downing Street, Cambridge, is investigating variation in the species of *Veronica* section *Beccabungae*, and would be grateful for herbarium specimens and if possible, seeds of these species.

ANNUAL SPECIES OF *SILENE*

Mrs E. Bari, Botany School, Downing Street, Cambridge, would be grateful for samples of wild-collected ripe seed of annual species of *Silene* from Britain or the Continent. Recently collected, unpoisoned herbarium material would be most welcome if a ripe sample could be extracted.

SCIRPUS

Dr J. K. Spearing of the Department of Botany and Zoology, Sir John Cass College, Jewry Street, London, E.C.3., is anxious to obtain viable seeds from reliably determined species of *Scirpus* (*sensu lato*), or alternatively fresh specimens with roots attached, for a comparative study of root anatomy of this genus. Notes on the provenance of specimens would be appreciated. Postage and packing costs will be refunded.

EDITORS OF *WATSONIA*

Dr C. D. K. Cook, Dr M. C. F. Proctor and Dr N. K. B. Robson have been appointed Editors of *Watsonia.*

All manuscripts to be considered for publication in *Watsonia* should be sent to Dr C. D. K. Cook, Hon. Receiving Editor *Watsonia*, The Hartley Botanical Laboratories, The University, Liverpool.

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CONTENTS

Papers and short notes are invited on the taxonomy and distribution of British vascular plants as well as on topics of a more general character and wider appeal from both members and non-members of the Society.

Contributions should be sent to the Hon. Editor, E. F. Greenwood, c/o The City of Liverpool Museums, William Brown Street, Liverpool, 3.

The Society as a body takes no responsibility for the views expressed by the authors of papers.

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Papers and short notes must be submitted in final fully corrected form. They should be typed in double-spacing, with wide margins and on one side of the paper only. Authors should keep a fully corrected carbon copy of their typescripts for reference.

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NOMENCLATURE

Names of British vascular plants should normally follow the *List of British Vascular Plants* by J. E. Dandy (British Museum (NH) and B.S.B.I., London, 1958) and may then be cited without authorities. Otherwise authors names must be cited at least on the first occasion where they appear in the text.

REFERENCES

References to the literature should be arranged in alphabetical order of authors' names at the end of the paper. Each reference should be given in a standard form thus:- Poore, M. E. D. (1956). The ecology of Woodwalton Fen. *J. Ecol.*, **44**, 455-492.

Abbreviations of titles of journals should be given in the form adopted by the *World List of Scientific Periodicals* (ed. 4, London, 1963-1965). The volume number should follow the abbreviated title of the journal and precede the page number. Citations in the text should be indicated by the author's name followed by the date of publication. If more than one paper is given in a single year they should be named thus:- Poore (1965a), etc.

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References to herbaria should include the abbreviations given in *British Herbaria* (B.S.B.I., 1958) and *Index Herbariorum* Part 1 (ed. 5, I.A.P.T., Utrecht, 1964).

If in doubt about the citation of names, references or the presentation of illustrations etc. contributors are advised to consult the editor before submitting their typescripts.

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Proceedings of the Botanical Society of the British Isles

April 1968 Volume Seven Part Two

Contents

WILLIS, A. J. & KING, SYLVIA M. A Broad-leaved Variety of *Festuca rubra* L. 143–149

LOUSLEY, J. E. A Glabrous Perennial *Sonchus* in Britain 151–157

GREENSLADE, P. J. M. A Note on Wistmans Wood, Dartmoor ..159–163

ALLEN, D. E. *Neotinea intacta* (Link) Reichb. f. in the Isle of Man ..165–168

GREENWOOD, E. F. The British Herbarium of Flowering Plants and Ferns at the City of Liverpool Museums 169–172

PAGE, C. N. Spiral Shoots in the Great Horsetail, *Equisetum telmateia* Ehrh. 173–176

MCCLINTOCK, DAVID. Further Notes on *Erica ciliaris* in Ireland ..177–178

OAK WOODS AND BIRCH WOODS 179–187

PLANT NOTES 189–194

PLANT RECORDS. Compiled by E. C. WALLACE 195–199

ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 201–290

OBITUARY 291–292

REPORTS

Annual General Meeting, 29th April, 1967 293–295
Report of the Welsh Region Autumn Meeting, 1967 295–296
Field Meetings, 1967 297–304

PERSONALIA AND NOTICES TO MEMBERS 305–308

INSTRUCTIONS TO CONTRIBUTORS 309–310

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December 1968 Volume VII Part 3

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PRESIDENTIAL ADDRESS 1968

THE B.S.B.I. IN A CHANGING BRITAIN

J. G. DONY

In the present century our Society has survived two wars. It emerged from the First World War comparatively unchanged with G. C. Druce dominating the scene as he had before the war began. The Reports increased in size and included Floras of Zetland and West Ross, both by Druce. We also published *Comital Flora* and a second edition of the *British Plant List*, again both from the pen of Druce. When Druce died in 1932 the Society was put on a sounder basis with officers, a committee and the beginnings of a local organisation. We owe much to the members who between 1932 and 1939 laid the foundations upon which the subsequent development of the Society was built. Some of these are still with us as active members, but others, the Foggitts, P. M. Hall, Francis Druce, A. J. Wilmott, to mention but a few, did much to bring about a transformation of the Society.

The Second World War tried us severely for at times the Society came almost to a standstill. There was, however, a determination that once the war had finished further changes would come. At first progress was slow but once begun gained momentum. It may be well to look at some of the more important changes in chronological order.

Field meetings renewed	1946
Change in name of Society	1947
Adoption of new rules and organisation	1947
First conference	1948
First Conference Report	1949
'Watsonia' launched and 'Year Book' replaced 'B.E.C. Reports'	1949
Exhibition Meetings replaced tea parties	1948
Beginning of Maps Scheme (in full force by 1953)	1950
Exchange of specimens abandoned	1952
'Proceedings' replaced 'Year Book'	1954

It was in these years of change that the membership of the Society grew at a rate which is best shown pictorially. Our expansion it must be stressed was with no sacrifice of the aims of the Society which are unchanged.

We do nothing now that we did not do thirty years ago and indeed we did one thing then we do no longer, namely exchange specimens and by so doing act as a body to aid in the maintenance of adequate representative collections of British plants in the national and other public herbaria. The latter many of us continue to do only as private individuals. We do things now very differently

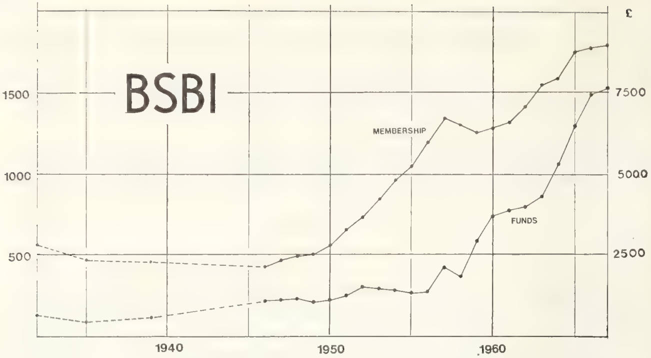


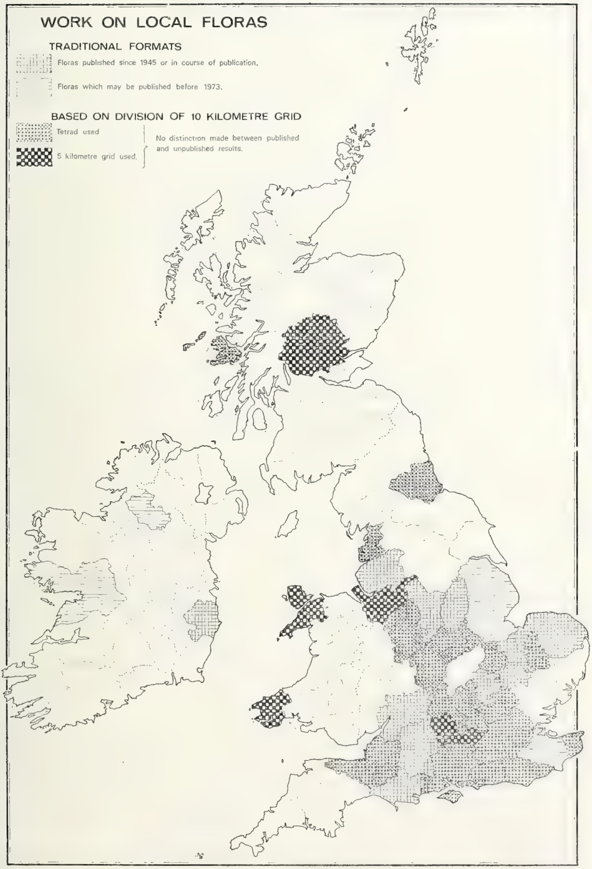
FIGURE 1. The growth of the Society in the post-war period. The fall in membership in 1958 and 1959 was mainly a result of a rise in the annual subscription.

as you will realise when you compare how little we published in a year then and the few meetings we held compared with what we do now. I am not prepared to claim that we are more efficient or effective, although I think we are, but I do submit that what we do is more intelligible to a greater number of persons. We should, however, realise that our progress so far has only been made possible by the tremendous amount of voluntary service given by a succession of officers. Among these I trust that I may be permitted to mention our late President, E. F. Warburg, D. H. Kent, E. Milne-Redhead and above all J. E. Lousley, whose first service to us was as our Treasurer in which office he was so ably followed by E. L. Swann and the present holder of that all-important post. Money was at one time a great worry to us but our happier financial position allows us now to relieve our officers of some routine burdens by paid professional assistance.

In outlining what appears a happy story I must add a warning note. Our funds of £4 10s. per member look healthy compared with £2 per member in the immediate post-war period but it is doubtful whether they have kept ahead of the rising prices of the period. We are, however, in danger of failing to hold our increased membership, as our increase in membership in recent years has been negligible. If we are content to stand still we may soon find ourselves in decline.

The Council and Officers of the Society are aware of this danger and for this reason we are embarking today on the venture of Network Research. The pilot scheme of this, which will be outlined this afternoon, is one which we trust will absorb the energies of field botanists in serious work from which useful results will emerge. It is to be hoped that here we have found the solution to some of our problems.

The Britain which has changed for us has changed equally for others. Twenty years ago when we began to expand there was no Nature Conservancy, no Council for Nature and County Naturalists' Trusts were very few indeed. We were in the forefront of the conservation movement and have remained so as was witnessed in the lead we made in the fight to save Upper Teesdale. We shall be ready to act in a similar manner should the need arise but it is becoming more evident that we must in future work increasingly with other bodies whose presence and growing strength we welcome.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TRADITIONAL FORMATS
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Floras which may be published before 1973.
BASED ON DIVISION OF 10 KILOMETRE GRID
Tetrad used
5 kilometre grid used.
No distinction made between published and unpublished results.

FIGURE 2. Work on local floras.

With a Britain that will continue to change it becomes once more necessary for us, just as we did twenty years ago, to examine the means by which we make what we are doing more intelligible to a wider public. This was, I consider, done in a superb manner by the Maps Scheme. We none of us had any difficulty in explaining to a child, a porter at a country railway station, a farm labourer, a gamekeeper, that here was a map and a card on which was printed the names of 800 plants and we were trying to find how many of the plants could be found within the area covered by the map. That others of normal intelligence understood what we were doing and why we were doing it did not detract in any way from the scientific value of the exercise. The result was indeed the envy of workers in all other fields concerned with geographical distribution. Above all the Maps Scheme played no small part in the continued expansion of the Society.

The success of the Maps Scheme has stimulated a growing interest in the study of the floras of small areas for at no time in our long history have more Local Floras been in the course of preparation. A map which I have prepared for your examination shows the extent to which the work on these is based on a division of the National Grid and consequently inspired more or less directly by the Maps Scheme. Not all of these are certain to reach the stage of publication but it is probable that in the next fifteen years more Local Floras will be published than in any comparable previous period. Their publication at low enough prices to ensure satisfactory sales is a matter to which the Society is giving some attention.

The use of divisions based on the National Grid has many advantages over the methods of division which have previously been used. Those based on river drainage or natural regions cannot be followed easily on maps. Parishes as a basis of division appears to have many virtues but parish boundaries are subject to frequent change to meet the needs of local government. The parishes vary so much in size and shape that they can only be used with great difficulty as the basis for distribution maps. It is interesting to note how many revisions of Local Floras are based on the use of tetrads (two-kilometre grid squares) adopted by me in the *Flora of Hertfordshire*. We welcome, however, Dr Bowen's *Flora of Berkshire* based on five-kilometre grid squares as much is to be learned from a comparison of different methods.

The increasing use of the National Grid for detailed recording leads me to an examination of the processes of wider range recording. The method we have so far used is the Watsonian vice-county system. This was devised by H. C. Watson in 1859 and was very simply the use of the counties as they were in his day as the basis. He then divided some large counties into two or more parts and joined some small counties to others. Outlying parts of counties were considered to be parts of the counties which encircled them or of the county with which they had the greatest boundary. There were inconsistencies such as joining Rutland with Leicestershire but leaving Linlithgow which was smaller than Rutland as a separate vice-county although it joined Midlothian which was smaller than Leicestershire. Notwithstanding Watson's care his vice-counties were very variable in size as the largest was at least twelve times as big as the smallest. The actual size of most of the units Watson did not know and neither do we.

Difficulties were met in the application of the Watsonian system after the Local Government Act of 1888. As a result of this Act a number of areas were transferred from one county to another to make new administrative counties and the larger counties were divided to make other new administrative areas. These new units of local government which now became shown on maps did not coincide with Watson's vice-counties. He was now dead which was a pity

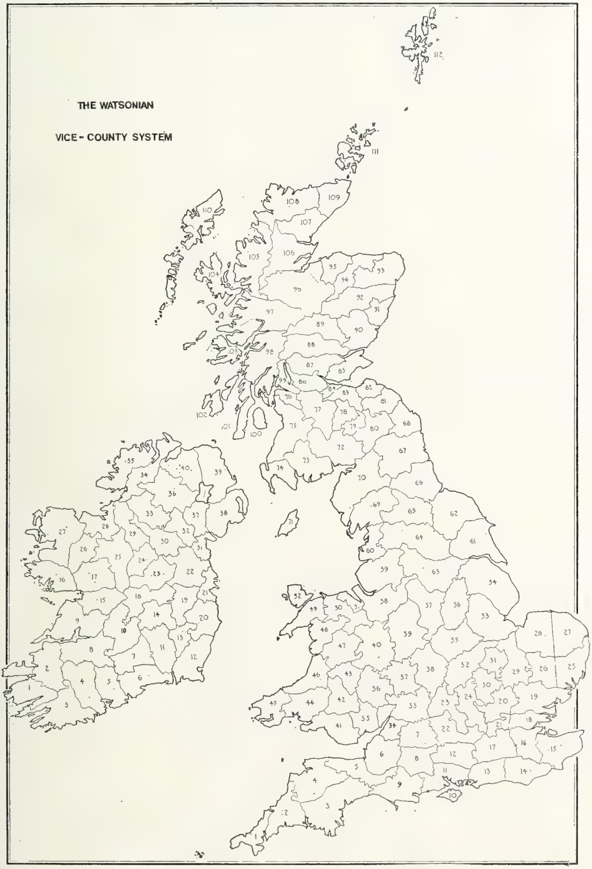

FIGURE 3. The Watsonian system of recording. This is intended to show the principle of the Watsonian system but does not show the exact limits of the vice-counties.

as he would have realised the full significance of the changes, others did not. The changes did not end in 1888 and we are now in the midst of a period of great transition for the work of the Boundary Commissions has scarcely begun. For a long time botanists talked loosely of plants being lost to this or that vice-county and gained by another as the places in which they grew were transferred from one county to another. Among local Flora Writers Amphlett and Rea in the *Botany of Worcestershire* (1909) were alone in realising that a change in boundary needed to be accounted for and it was the *Flora of Gloucestershire* (1948) which for the first time distinguished clearly between administrative counties and Watsonian vice-counties. Most of the county floras of the present century have left doubt in the reader's mind as to the area covered by the Flora.

Mistakes have crept into the Watsonian system from three principal causes:

1. purely clerical errors which would arise in any system.
2. errors in vice-comital recording arising mainly from a lack of knowledge by the recorder of a boundary problem.
3. errors in identification which are most marked in some of the more or less critical groups and in species pairs.

There are also omissions of reliable records in literature.

An analysis of the records for v.c.30 Bedford, in *Comital Flora* shows about thirty dubious entries, including some obvious errors, and about twenty omissions. The corresponding figures for v.c.20 Herts., are not so serious as a Flora of that county had been published in 1887 but they show fourteen dubious entries, with again some certain errors, and over thirty omissions. Druce may have had good reasons for what he put in and what he left out but we have no means of discovering what these reasons were. I give two typical examples. Watson listed *Thesium humifusum* in *Topographical Botany* for v.c.30 citing as his evidence a specimen sent to him by Elizabeth Twining. As her specimen is from v.c.20 it is obvious that Watson had made a mistake. Druce also listed *Thesium humifusum* in *Comital Flora* for v.c.30 but there is no evidence given as to the date of the record and we cannot be sure that Druce himself did not find the species in v.c.30 although no one else has apparently done so. It is an unsatisfactory situation but *Thesium humifusum* must remain for all time as being recorded for v.c.30. The second example is similar. In 1820 W. J. Blake collected *Orobanche minor* at Welwyn in v.c.20. He named it correctly but put a specimen of *Picris hieracioides* on the same sheet. Ninety years later Blake's herbarium came to Druce who promptly named the specimen *Orobanche picridis* and recorded it in the 'B.E.C. Report' for 1912. Later he listed *Orobanche picridis* for v.c.20 in *Comital Flora* but again there is no evidence that this is a 19th-century or 20th-century record. Druce could well have found the species in v.c.20 which he visited a number of times. *Orobanche picridis* must remain, slender though the evidence be, as recorded for v.c.20.

My analysis may be compared with the list given in an appendix to the *Atlas of the British Flora* of about 5,500 records linked to the vice-comital system for which no reliable evidence could be found. I estimate that there are between 5,000 and 10,000 entries in the Watsonian system in need of emendation. I compiled the *Flora of Hertfordshire* without once consulting the *Comital Flora* and my advice to any Local Flora worker who has *Comital Flora* on his bookshelf is that he would be well advised to leave it there.

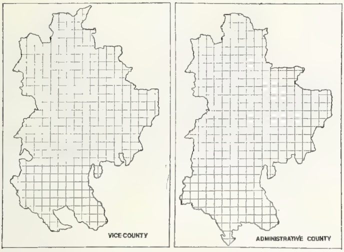

FIGURE 4. Boundary problems. These maps show vice-county 30, Bedford, and the Administrative County of Bedford with the County Borough of Luton. It is difficult to see without a close examination where a boundary problem is involved.

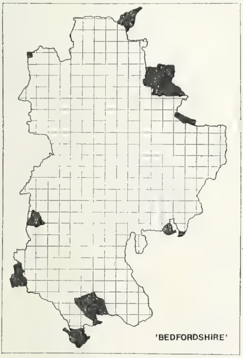

FIGURE 5. The boundary problem solved. A close examination shows that in no fewer than nine areas the vice-county boundary differs from the administrative county boundaries shown on present-day maps. Still more changes may be made. In all the areas shown black there is a possibility of errors in recording.

For the correct continued working of the Watsonian system we need maps showing the exact boundaries of the vice-counties. This problem has for some years received the attention of Mr J. E. Dandy who has prepared maps on a one-inch Ordnance Survey series with the boundaries clearly shown. These may be seen at the Department of Botany at the British Museum (Natural History) and by using these maps Mr Dandy has marked other maps for most Local Flora workers. The Ray Society is now in the course of publishing Mr Dandy's maps on which the vice-counties will be shown in relation to the National Grid. This will be of great value to us all as the map most of us have used is that taken from *Comital Flora* which contains some glaring major errors. I regret to say that the scale of the Ray Society maps will be only ten miles to an inch which is not satisfactory for accurate field work. For that they are not intended. The new maps at the very least will give some indication of areas in which we must show care with our records if they are to be related to the Watsonian system.

I suggest to you that the time has come to give serious thought to the future of wide range recording but first we need to ask if we still need such a system. I think that we do. The ten-kilometre grid square used by the Maps Scheme proved ideal for national recording but had some defects. With so many units the *Atlas* no doubt contained more errors and had more omissions than *Comital Flora* although it is not likely to have had so many in proportion to the number of units of recording. The units were too many and the competent botanists too few to obtain the correct distribution of some microspecies, subspecies and hybrids. *The Critical Supplement*, the publication of which we celebrate today, makes good many gaps in the *Atlas* but in some instances reveals the areas in which work was done rather than where the plants grow. We still need a basis for wide range recording with a smaller number of units than the Maps Scheme.

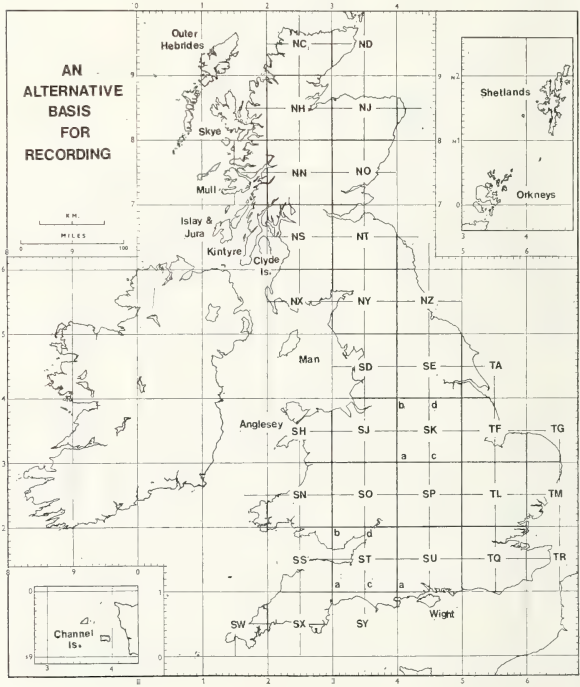

FIGURE 6. An alternative system of recording. This is based on a division of Great Britain into units 50 km. square leaving large islands and groups of islands as units in their own right. Ireland has been excluded pending discussions on the future of recording there.

We are I think faced with two broad alternatives. The first is to persevere with the Watsonian system as it has been handed down to us eliminating as far as we are able the errors and making good the omissions. It would mean a tremendous amount of work for a handful of about twenty of us leaving the other 1,600 of us as wondering and admiring onlookers. The result could be a much more reliable *Comital Flora.*

The other alternative is to begin again and forget the past, allowing *Topographical Botany* to be a monument to Watson's industry and care and *Comital Flora* a memorial to Druce's optimism. We could then proceed to account for the distribution in the nineteen seventies not only of species, but of infraspecific taxa and the kind of information we shall collect for the Network Research. This could be done by continuing to use the Watsonian vice-counties or by introducing a new system. I would make a plea that we should now decide just what we are to do. If we persevere in any way with the Watsonian system we must ensure a constant supply of the Ray Society maps as it will cause trouble if only 5% or 10% of us have them. We should be prepared to buy a large stock, as many as 10,000, to see the exercise completed. I ask you, however, to consider the merits of another system based on the National Grid having as its unit a 50-kilometre square. This would give three stages of recording:

1. the *tetrad* now used by most Local Flora workers.
2. the *ten-kilometre square* consisting of 25 tetrads as used for the Maps Scheme and now becoming increasingly used by others for national recording.
3. the 50-*kilometre square* consisting of 25 ten-kilometre squares to be used for less detailed recording, i.e. for all purposes for which the Watsonian system has been used.

Such a system would have many virtues.

(a) it would be simple and could be understood by all.
(b) it would be more likely to be acceptable to zoologists for we may reconcile ourselves to one thing which is that they will never use the Watsonian system. It is most desirable that in these days we should all use the same system.
(c) the units would be easy to enumerate.
(d) it would be inexpensive to field workers as the National Grid is shown on many maps. The new 'A.A. Members Handbook' shows the system as clearly as it could be shown although the sectional maps are on too small a scale for recording purposes. A complete set of 'Esso' maps on a more satisfactory scale of five miles to an inch costs only three shillings.* The best series of all is the ¼-inch Ordnance Survey the total cost of which is under £5.
(e) it would give approximately the same number of units as the Watsonian system which in this respect was satisfactory.
(f) the units would be of the same size and shape and so lend themselves to the production of postage-stamp size maps to show problems of distribution.
(g) the system would fit in well with the mapping of the European flora which is also being undertaken on a 50-kilometre grid.

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*Since increased to six shillings.

If such a system were adopted it would need some modifications before it could be applied. The 50-kilometre grid lines cut some islands into parts and in these cases the islands could well be considered as units in their own right. In a few cases some small coastal areas comprise a unit. A simple rule could be made that if the area of these units is less than a specified size, say forty square kilometres, they will be linked with the neighbouring unit with which they have the greater common boundary line. These modifications would be few and could be shown clearly and simply on a master map which could be produced for a negligible sum.

There would be many objections to introducing a new system. I have anticipated the greatest of these that it would break a continuity of records. If continuity is needed, which I doubt, it could be achieved in a new system as easily as retained in an old. Previous records are either localised or not. If they are localised they can generally be incorporated into any system if the units for recording are large enough and I would have no difficult in putting almost all, if not all, the previous localised records for Bedfordshire and Hertfordshire into a new system. The unlocalised records give trouble in any system and are probably best forgotten. One of my criticisms of *Comital Flora* is that it does not distinguish between an eighteenth or nineteenth century record not substantiated in the present century and a current record. With very small maps one could afford to print three or four maps showing the change of distribution of a species over a period of time. One great advantage of maps over text is that a large number of symbols can be used—ten is not an impossible number and it is difficult to invent that number of variants of type.

A second objection could well be that the Watsonian system has been and is still of great assistance to Local Flora workers. I would indeed be the last to deny that it is useful if one is interested in a vice-county or an administrative county the greater part of which is a vice-county, to follow through the appropriate vice-county number in the Exchange Club Reports, our own Plant Records and herbaria arranged in vice-comital order. In doing so I have often wondered how many records I have missed from recorders having in all innocence listed the plant from the wrong vice-county. With the alternative system which I have outlined a worker would have to check records from fewer recording units than is often his task now.

Yet another objection could well be that a new system might lead to the end of county Floras and the advent of blocks of grid squares. Such an innovation which is one which I would deeply deplore is far removed from my thoughts. It does not follow that the unit of wide-range recording is the only basis for a Local Flora, or that it is of necessity the best. With the accepted use of the Watsonian system we have had in recent years more Floras of administrative counties than vice-counties. We have work being done on a natural area in Breckland and London botanists are collecting records from a circular area some twenty miles in diameter. Whether these ventures are well designed or ill-conceived time alone will tell. I think that it is most unlikely that any success can come from the publication of a Flora of a Watsonian vice county and that the only viable unit is an area shown on a map that anyone can buy in any good bookshop. A Flora of a Watsonian vice-county can only be published for what it is and be faced with heavy financial loss or need for considerable subsidy or it can be palmed off for what it is not, a

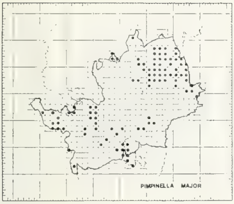


FIGURE 7. The use of tetrads for detailed recording. This shows the distribution of *Pimpinella major* in Hertfordshire using a basis of tetrads (2 km. × 2 km.). There are twenty-five tetrads in a ten-kilometre grid square.

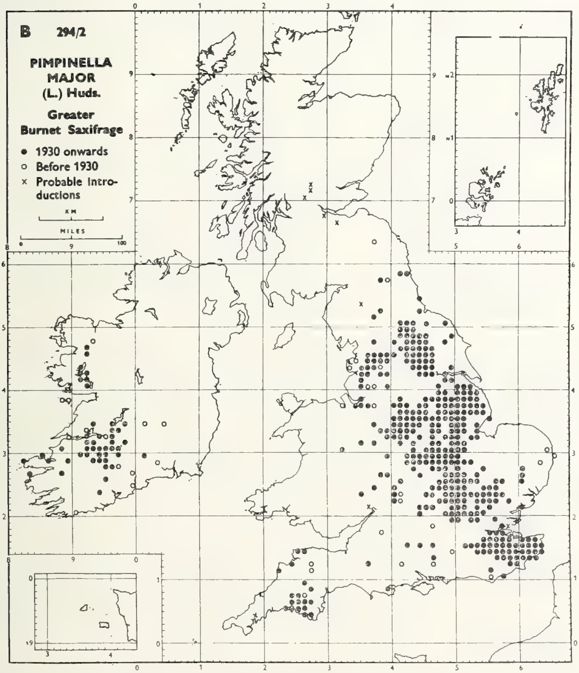


FIGURE 8. National recording. This map, supplied by the Biological Records Centre, shows the distribution in the British Isles of *Pimpinella major* on the basis of ten-kilometre squares now widely used for national recording.

Flora of an administrative county. We may not be aware of any difference but others will be.

We should reconcile ourselves to the simple fact that there is a demand, and an increasing one, for Floras of administrative counties, but nothing more. Government departments, local authorities, county naturalists' trusts by their articles of association, the vast majority of other naturalists and archaeologists work to and understand a system of administrative counties and may sooner or later find a Flora useful. Apart from a minority among us a Watsonian vice-county means little or nothing. There is also a local patriotism we cannot afford to neglect. I know two counties very well indeed and find in each a great pride in the county as it is today, although in neither case is there very much to be proud about; but I sense no affection at all for the county as it may have been in 1852. An administrative county is likely to remain for a long time the most sensible unit for a Local Flora and I hope that it will continue to be so.

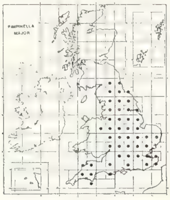


FIGURE 9. The application of an alternative system to wide range recording. This shows at a glance the broad distribution of *Pimpinella major* in Great Britain taken from records in the *Atlas of the British Flora*. It is based on a unit 50 kilometres square consisting of twenty five ten-kilometre squares. A variety of symbols could be used to show such details as comparative abundance, previous records and dubious records.

My final task is to consider the application of an alternative system of recording. It could first be used for a thorough and intensive survey of the British flora extending beyond the range of species to microspecies, subspecies, hybrids and variants of many kinds. With so few units for recording the records could be substantiated by present, and if need be past, vouched-for material which constitutes the only basis for a satisfactory record. It could be Watson's *Topographical Botany* renewed in the twentieth century. A project organised with such a view in mind could closely rival the Maps Scheme with the enthusiasm it would arouse.

The results of a new wide-range survey could be shown in a smaller Atlas having about twenty maps to a page. An Atlas with 3,000 maps would make a slim volume of 150 pages, 4,000 maps would occupy 200 pages (*Comital Flora* had over 400 pages!). Maps are cheaper to print than text and I can see no reason why a smaller Atlas could not be produced to sell at a handsome profit for as little as £1.

If adopted would such a new system become permanent? I think not and sincerely hope not. Watson used the best means at his disposal to account for plant distribution in Great Britain in the third quarter of the nineteenth century. We need now to repeat that process but to think about the means by which we do it. To retain the means that Watson used can in my opinion be compared only to fitting a rubber horn to a Bentley. If we do adopt a new method we can be sure that it will be short-lived. Maps will change and to a future generation the motor car, computers and jet aircraft will seem as strange as the Puffing Billy and hansom cabs do to us. The need to study the distribution of the British flora will remain. Our immediate task is to do this in the most effective way we can leaving it to future workers to devise even better methods.

British botanists have been twice pioneers in the study of distribution. A century ago Watson introduced his excellent system which served well the needs of his generation. Twenty years ago we introduced the Maps Scheme the principle of which is now widely used by others. We could now convene a conference of all recording societies to examine the future of wide-range recording.

A RAILWAY FLORA OF RUTLAND

K. G. MESSENGER

GENERAL DESCRIPTION

The railways of Rutland were built by three major and two minor Railway Companies. The system is based on three principal routes. The first to be opened was the Syston and Peterborough branch of the Midland Railway, opened to traffic in 1848. This was followed in 1851 by the Rugby, Market Harborough and Stamford branch of the London and North Western, which made a junction with the Midland at Luffenham. Thirdly came the northward extension of the Great Northern main line from Peterborough. The dates of subsequent additions to the system are given in Table 1, together with dates of closures. In the map (Fig. 1) the various sections are numbered for convenience in dealing with their flora, and these numbers are given in Table 1.

TABLE 1

Section	*Opened*	*From*	*To*	*Owners*	*Mileage*	*Closed*
1	1848	Whissendine	Manton	A	9	—
2	1882	Ashwell	Cottesmore	A	2½	—
3	1880	Manton	†Welland Viaduct	A	4½	—
4	1848	Manton	Tinwell (Stamford)	A	8	—
5	1851	Caldecott	Seaton	B	4	1966
	1879	Seaton	Barrowden	B	2½	1966
6	1851	Seaton	Luffenham	B	3¾	1966
7	1895	Seaton	Uppingham	B	3	1964*
8	1852	Through Essendine		C	2	—
9	1860	Essendine	(Bourne)	D	1	1951*
10	1856	Essendine	Stamford	E	2¼	1959*

†Often called Harringworth Viaduct after the nearby Northants. village.

NOTES

Ownership:
- A—Midland Railway to 1923; L.M.S.R. to 1947.
- B—L.N.W.R. to 1923; L.M.S.R. to 1947.
- C—Great Northern Railway to 1923; L.N.E.R. to 1947.
- D—Great Northern Railway to 1923; L.N.E.R. to 1947; the early history of this line is inextricably tangled with that of the forerunners of the Midland and Great Northern joint lines, notably the Eastern and Midland Company, but by 1872 it was indubitably a part of the G.N. system.
- E—Stamford and Essendine to 1872; G.N.R. to 1923; L.N.E.R. to 1947; The line was worked by the G.N.R. until 1864, and then privately by the Marquess of Exeter until 1872.

The L.M.S.R. became the London Midland Region of British Rail (B.R.) in 1947, and the L.N.E.R. became the Eastern Region. In a subsequent readjustment of boundaries, all lines in Rutland to the east of Seaton and Luffenham were transferred to the Eastern Region.

MILEAGE: Figures in this column of Table 1 are of mileages in Rutland. The figure for the Ashwell Mineral branch is the length owned by B.R.

CLOSURES *—Dates so marked in Table 1 are lines which have been dismantled since closure.

MINERAL LINES: Apart from the Ashwell branch, serving ironstone quarries at Cottesmore, Burley and Exton, there are shorter private mineral branches at Pilton, Ketton and Market Overton (See Fig. 1).

MAJOR ENGINEERING WORKS: Tunnels—Manton, Wing, Glaston (1,850 yards (1·7 km.)), Seaton, Morcott; Welland Viaduct (about a quarter of this is in Rutland); Embankments and cuttings are numerous, the most important being one a mile long at Whissendine over marshy ground; Goods yards—Ashwell, Manton, Seaton, Uppingham, Morcott, Luffenham, all dismantled; Oakham station yard is still used but the former provender mill sidings are not. Oakham station is the only one open for passengers.

If the county is divided into roughly equal eastern and western halves, the eastern half consists, geologically, of Oolitic rocks, mainly limestone, covered with clay, while in the west there is a mixture of Lias clays and Marls, in some places overlaid with Northampton sand. In the West the land rises to just over 600 feet (182·9 m.), but is split by several deep valleys running east and west. In the east the elevation becomes lower and the valleys shallower as the diminutive rivers in them approach the Welland. In the north-west corner of the county, drainage is towards the Trent rather than the Welland, though the watershed is hardly noticeable. The dividing line between Oolitic and non-Oolitic country lies a little to the east of Manton and Seaton, and is an important factor in the floristic pattern of the county. A general account of the topography and geology of the county is given in Horwood & Gainsborough, 1933.

BOTANICAL DESCRIPTION

Railway property embraces a considerable diversity of plant habitats, which can be grouped into three principal categories. These are, firstly, the mainly grassy slopes which flank the line on embankments and cuttings; secondly, the ballasted road bed; and thirdly, railway buildings, including stations, bridges and tunnel portals, retaining walls, and various other structures. Much of the interest of railway flora derives from a combination of circumstances in which on the one hand plant communities are protected from the destructive influences of modern agricultural practice, while on the other they are subjected to a whole range of controlling influences deriving from railway practice. The extent to which these do control the flora can readily be seen when a line is closed and dismantled. The artificial equilibrium is lost and the flora very soon loses its distinctive character.

EMBANKMENTS AND CUTTINGS

By far the largest proportion of railway property in Rutland consists of lineside grassland and scrub. It is maintained in a fairly stable ecological balance by

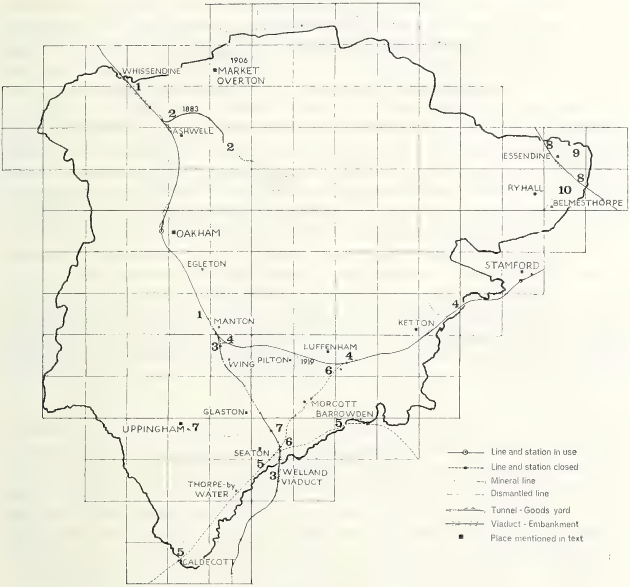


FIGURE 1. Railways of Rutland

periodical burning, and from time to time the scrub is cleared by hand cutting. No doubt the periodicity has been established by trial and error over the years, and one object of the practice was to discourage such rank growth as would constitute a serious fire risk in the days of steam traction. The result has been to discourage the excessive growth of coarse grasses and nettles, and to encourage the more delicate species. So, in some respects, railway grassland resembles old pasture controlled by cutting and grazing, or moorland which is regularly burnt.

One important difference, however, is that the railway communities have developed in a comparatively short time on the exposed surface of what was essentially subsoil. Any cutting exposes the subsoil *in situ*; any embankment is partly built from subsoil derived from nearby cuttings, but considerable volumes of material are also brought in from a distance. There are often quite startling variations in the floral cover in quite short stretches of apparently uniform embankment. Similar variations in cuttings may be due to local geological variation, but they are sometimes evidence that the sloping surfaces were initially unstable and had at some stage to be consolidated with imported material. This may be the explanation of the anomalous *Deschampsia flexuosa* communities near the mouths of two tunnels in the county (see p. 329).

Slope and surface drainage constitute a third factor influencing the flora. So far as I am aware, no one has used railway embankments for performing classic profile and belt transect exercises, but there are many places in Rutland which could be used for this kind of teaching, if only they were a little more accessible. It has been stated too that the north and south facing slopes of an embankment or cutting running east and west show clearly the effects of differing degrees of insolation. This may be so, but I suspect that some of these apparent effects are at least partly the result of exposure to, or shelter from, the prevailing wind. There are several places where the engineers clearly had difficulty with the drainage of cuttings, and had to provide drainage channels on the slopes and ditches, conduits and culverts. This accounts for the presence in the flora of aquatic and marsh plants.

A study of the changes which occur when a line is closed and dismantled shows that even on the steepest slopes scrub soon invades the grassland, as it does in disused quarries. There is evidence on abandoned lines in east Leicestershire that this is fairly soon transformed into Ash woodland, but none of the Rutland lines has progressed this far. The end product is dull and depressing, but the process has interest and the tenacity of some of the declining species is remarkable.

THE PERMANENT WAY

The road bed on which the track of a working railway is laid, is normally kept free of plant cover by the frequent use of herbicides. The top layer, supporting the track, consists of coarse chippings, often of porous slaggy material. Below this is a thick layer of cinder ballast, usually on a clay base. When a line is dismantled the top layer is usually removed and the cinder ballast left exposed. As soon as a line goes out of use plants begin to invade the ballast, but comparatively few species succeed in establishing themselves until the top cover is removed. It is on the exposed cinder ballast that many of the railway 'rarities' are to be found, many of them ruderals or wall denizens elsewhere. A general account of some of these is given by Salisbury, 1961. The places with the richest variety of such species are the disused goods yards at several of the stations. At Oakham there is a large area formerly covered by the sidings serving a provender mill for railway cart-horses. Although part of this is gradually becoming overgrown, it still has a rich and varied flora.

Away from goods yards the dismantling of a line is followed by a rapid development of many of the goods yard species and a slower invasion by species from the flanking grassland. A sort of stability will result if the ballast continues in use as a footpath, but if the boundary fences are removed and grazing animals are allowed on to the roadbed the characteristics of the railway flora are soon lost. It will be interesting to see how far County Naturalists' Trusts succeed in their efforts to conserve interesting stretches of disused line, but I suspect they may find the physical labour needed to keep the plant life more or less stable greater than they expected.

BUILDINGS AND BRICKWORK

Practically all railway building in Rutland was carried out in brick, and masonry is uncommon though not wholly absent. A good deal of the brick was locally produced, and there are traces of former brick yards beside the line at Pilton and Ketton. Most of the overbridges have brick arches, though steel girders are used generally in underbridges. The Welland Viaduct is the longest brick viaduct in the country, though less than a third of it is in Rutland. Eight of the county's nineteen species of ferns grow on railway brickwork, and there is a range of other species there as well, though the wall flora is not as rich as that on the limestone walls in the county.

Station gardens and lineside allotments account for many of the common garden weeds occurring in the list of species (see p. 334). In addition, some cultivated species originating in station gardens have become established by the line nearby. However, it is not easy to account for the regular appearance of *Antirrhinum majus* on the brickwork of Glaston south tunnel portal, deep in farming country, and remote even from the nearest house.

NOTES ON INDIVIDUAL SECTIONS OF THE LINE

1. WHISSENDINE TO MANTON. The northern part of this section has little special interest, except in the disused yards at Ashwell and Oakham. The flora resembles that of nearby roadsides. There is, however, an interesting assemblage of aquatics in the broad drainage channels on either side of the long embankment at Whissendine, which owe their existence to the diversion of the river when the embankment was built but they are outside the boundary fence. South of Oakham the lineside flora becomes richer, and just north of Manton tunnel there is an interesting example of how the flora can change within a few yards. Here, on a steep east facing slope, the embankment is covered for about thirty yards (27m.) with a vigorous growth of *Phragmites australis*, stretching from the top nearly to the bottom, and within a few yards the ground is dry and gravelly enough to carry a community containing *Pilosella officinarum* subsp. *officinarum*, *Verbascum thapsus*, *Arenaria* spp., *Arabidopsis thaliana*, *Lotus corniculatus*, etc. Other contrasts occur between Manton tunnel and the station. *Calluna vulgaris* grows above the tunnel portal, and *Anthyllis vulneraria* a hundred yards (91 m.) away on the slopes of the cutting.

2. ASHWELL MINERAL BRANCH. Only the first two and a half miles (4·0 km.) of this line were included in this survey, i.e. as far as the sidings where British Rail hand over operation of the branch to the quarrying company. The flora of the branch is very much like that of the main line except that the encroaching scrub is rarely, if ever, cleared. In the first half mile there are the only fully naturalised colonies of *Saponaria officinalis* and *Campanula rapunculoides* in the county.

3. MANTON to WELLAND VIADUCT. This stretch consists of a series of alternating tunnels, cuttings and embankments. The area around each tunnel mouth has its own special character. All appear somewhat acid, those of Glaston north and Seaton north being distinguished by large areas dominated by *Deschampsia flexuosa*. Apart from a small patch on the Uppingham branch this species grows nowhere else in Rutland. Wing tunnel south has *Ulex europaeus* and *Digitalis purpurea* and close to the south portal of Glaston tunnel there is an area where the engineers evidently had trouble with drainage. The problem was solved by making the cutting exceptionally wide, and leaving an expanse of marshy ground beside the line. *Phragmites* and several *Salix* species grow

here together with various other marsh plants. A short section of the embankment just north of the Welland Viaduct collapsed in the thaw following the cold winter of 1962-1963. During the rebuilding, the basal width was increased, to give a more gently sloping surface. Recolonisation of the new slope has followed much the same course as colonisation of newly exposed ballast, with the rapid establishment of species such as *Epilobium angustifolium*, *Pilosella officinarum*, *Chrysanthemum leucanthemum* and *Arrhenatherum elatius*, and a slower spread of *Rubus* and *Festuca* spp.

4. MANTON to TINWELL. In many respects this is the most interesting stretch of the line, showing as it does a gradual transition from neutral to limestone grassland flora in the first two miles. *Filipendula vulgaris* and *Poterium sanguisorba* begin to appear near Pilton; east of Luffenham there are large patches of *Clinopodium vulgare*, *Origanum vulgare* and *Campanula glomerata*, and other calcicoles can be found. Then, as the line approaches the Welland at Ketton, the strongly calcicolous character is lost, and the flora comes to resemble that of the next section approaching Barrowden. The Pilton mineral branch is distinguished by having the only colony of *Lathyrus nissolia* in the county, and at its junction with the main line, there is a large area of wet ground dominated by *Calamagrostis epigejos*. The Ketton Cement Works branch has its verges heavily sprayed with herbicides, and there is nothing of interest.

5. CALDECOTT to BARROWDEN. This is a level stretch of line with low embankments and shallow cuttings, running close to the Welland throughout its length. The most notable features of its flora are extensive colonies of *Lactuca* spp., *Equisetum telmateia*, *Fragaria* × *ananassa*, *Carex hirta*, *C. flacca* and *C. spicata*. Most of these occur on other sections, but nowhere more luxuriantly than here. *Arabidopsis thaliana* seems commoner on the ballast of this line and its branches than it is on the Midland. Ferns thrive on the brickwork, particularly of bridges, to a greater extent here than anywhere else except Manton station.

6. SEATON to LUFFENHAM. This short stretch of single track shows an interesting transition from the Welland valley flora at Seaton to the limestone flora at Luffenham. The first sign of this change is to be found near Morcott with the appearance of *Brachypodium pinnatum*. The engineers had drainage problems in the deep rock cuttings at Morcott tunnel and through South Luffenham village. South Luffenham and Belmesthorpe (Section 9) are the two places where the lineside flora is most strongly influenced by the proximity of houses and gardens. At Luffenham, seedlings of Barberry (*Berberis vulgaris*), Gooseberry (*Ribes uva-crispa*), Raspberry (*Rubus idaeus*) and Redcurrant (*Ribes rubrum*) had appeared in the ballast within a few weeks of closure of the line.

7. SEATON to UPPINGHAM. This three mile branch was closed in 1964 and dismantled a year before this survey was started. So far as is known, burning and scrub clearance were rarely done during its seventy years of operation, and a number of species occur here which are absent elsewhere. Examples are *Sarothamnus scoparius* and *Sorbus aria* in the scrub, and *Saxifraga granulata* in the grassland. *Populus tremula* is found where the line passes under the

Midland near Seaton, and this species is also common on the Midland embankment along this stretch. Close to Uppingham are the remains of a short mineral branch which can be traced through the fields to a disused ironstone cutting south of the town. Its flora has long lost any distinctive features.

8. ESSENDINE. The most interesting part of this section is in the immediate vicinity of the former station. Here there used to be a goods yard, now rather overgrown, serving the Bourne and Stamford branches. Immediately north of the station is a short steep-sided cutting in which there are exposures of limestone. The flora resembles that found near Luffenham on the Midland. *Salvia horminioides* grows in the goods yard, and there are large patches of *Medicago sativa* among the usual calcicoles in the cutting. Scrub is kept firmly in check in this section.

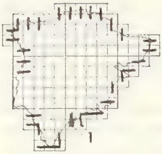
9. BOURNE BRANCH. This was the first of the Rutland lines to be dismantled and sold. The first 200 yards as far as the viaduct over the river Glen has remained fenced off, and shows an interesting late stage in the development of limestone grassland over the former road bed. Beyond the viaduct for half a mile the fences have been removed and grazing animals have had access. Here there is little to distinguish the road-bed except for occasional little stony patches where *Chaenorhinum minus* still reappears each year. Then, there is a short rather wet stretch to the county boundary where the road bed is used as a farm track and is covered with *Juncus bufonius* but here scrub is encroaching rapidly.

10. STAMFORD BRANCH. Closed in 1959, this section shows very well the early stages in the transition of the flora in a limestone area, and direct comparisons with the Uppingham branch are interesting. The flora is richest at Belmesthorpe and to the south of Ryhall station, though the latter section has recently been used to give heavy machinery access to a section of the river Gwash which the River Board has been dredging and 'improving'. The line leaves Rutland a few hundred yards south of this point.

STATISTICAL COMPARISONS

It would be very laborious to measure accurately the area of railway property in the county, but if the average distance between boundary fences is taken as 50 metres and the length of line as 78 kilometres, the area covered is approximately 4 sq. km. The general survey of the Flora of Rutland, carried out in the last ten years, has been based on a grid of 4 sq. km. (tetrads). A comparison of the number of species found on the railways with the numbers found in the tetrads of the general survey may be of interest.

Number of species found on railway property		372
Average number in each tetrad of the general survey		260
Number in the richest tetrad		391
Number in the poorest tetrad		174
Number of tetrads with more than 300 species	20	
Number of tetrads with fewer than 200 species	8	
Total number of tetrads	100	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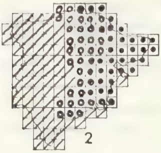
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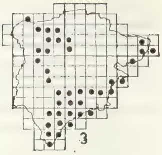
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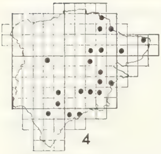
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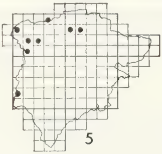
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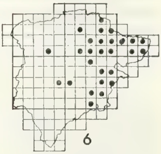
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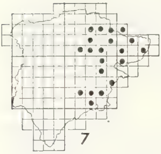
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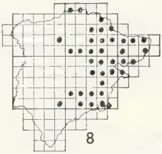
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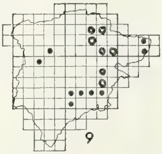
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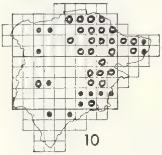
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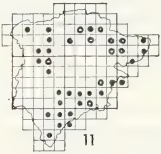
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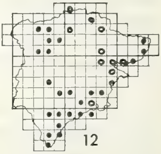
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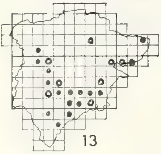
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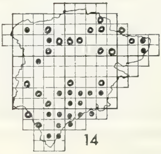
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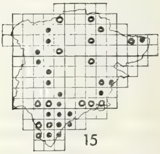
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It can be seen from these figures that the railways can be considered to be one of the richest botanical areas in the county. Of the twenty tetrads with more than three hundred species, only six are in the western half of the county, and all but one of these contain railway property. Of the fourteen in the east those containing railway property average about fifty species more than those which do not.

This paper is an extended version of an earlier paper published in the *Report of the Uppingham School Field Club* (Messenger, 1967).

LIST OF SPECIES

In the following species list all species which have so far been found growing on railway property in Rutland are recorded, with the exception of garden species known to have been deliberately planted. Experience gathered during the general survey of the flora of Rutland suggests that further field work is

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FIGURE 2. DISTRIBUTION MAPS

The maps are divided by national grid lines at 2 km. intervals, into 131 4 sq. km. (tetrads). For purposes of statistical recording during the general survey of Rutland, marginal tetrads were linked in such a way that there were 100 recording units averaging 3·94 sq. km., of which 66 correspond precisely to tetrads containing exactly 4 sq. km. of the county, while the rest contained either more (max. 5·54) or less (min. 2·60) than this figure.

1. Linked marginal tetrads.
2. Distribution of limestone in Rutland.
   ● Mainly limestone
   ○ Partly limestone
   / Clays, marls, sands and alluvium, but no limestone.
3. Tetrads containing railways.
4. Tetrads, with over 300 species in general survey.
5. Tetrads with under 200 species in general survey. Maps 4 and 5 should be read in relation to Map 2. The limestone areas have a richer flora than those without limestone.

6, 7 and 8. Distribution of three species common on limestone.
   6. *Cirsium acaule*
   7. *Helianthemum nummularium.*
   8. *Clinopodium vulgare.*

9, 10, 11 and 12. Distribution of four species common on limestone and found mainly or solely on railways outside the limestone area.
   9. *Erigeron acer.*
   10. *Brachypodium pinnatum.*
   11. *Chaenorhinum minus.*
   12. *Senecio erucifolius.*

13, 14 and 15. Species common on the railways, and infrequent elsewhere. Two of these are introduced species whose history in Britain is well documented (*e.g.* Kent, 1956, 1959, and 1964). It is suggested that the railways are one of the principal routes along which their dispersal took place.
   13. *Melilotus altissima*
   14. *Epilobium adenocaulon*
   15. *Senecio squalidus*

In maps 9 to 15, the symbol ○ indicates a railway record, and the symbol ● a non railway record.

unlikely to increase the list by more than about 15%. The number of species in the list is 372.

Symbols used:—

* Species recorded only on railway property.

† Species recorded mainly on railways and rarely elsewhere.

Where no comment is made on a species it may be assumed to be common on the railway in appropriate habitats.

4/9. Equisetum arvense L.

4/10. E. telmateia Ehrh. Ashwell; Glaston; Seaton.

8/1. Pteridium aquilinum (L.) Kuhn. Pilton; Essendine.

†14/1. Phyllitis scolopendrium (L.) Newm. Brickwork, occasional.

15/1. Asplenium adiantum-nigrum L. Brickwork, frequent.

†15/5. A. trichomanes L. Brickwork, occasional.

15/7. A. ruta-muraria L. Brickwork, common.

18/1. Athyrium filix-femina (L.) Roth. Single plants on brickwork, Ashwell, Manton, Thorpe-by-Water.

21/1. Dryopteris filix-mas (L.) Schott *sensu stricto*. Common.

21/7. D. dilatata (Hoffm.) A. Gray. Seaton.

*24/4. Gymnocarpium dryoptreris (L.) Newm. (*Thelypteris dryopteris* (L.) Slosson). Three plants on brickwork, Manton.

25/1. Polypodium vulgare L. subsp. prionodes Rothm. (*Polypodium interjectum* Shivas.). Brickwork, occasional.

31/1. Picea abies (L.) Karst. Luffenham, planted.

32/1. Larix decidua Mill. Occasionally planted.

33/1. Pinus sylvestris L. Occasionally planted.

46/1. Ranunculus acris L.

46/2. R. repens L.

46/10. R. auricomus L. Morcott; Luffenham.

46/24. R. ficaria L.

53/1. Berberis vulgaris L. South Luffenham, single seedling.

54/1. Mahonia aquifolium (Pursh) Nutt. Ketton.

58/1. Papaver rhoeas L.

58/2. P. dubium L.

†58/3. P. lecoqii Lamotte. Oakham; Egleton.

†58/5. P. argemone L. On ballast, Oakham, Seaton, Luffenham.

58/6. P. somniferum L. Oakham; Egleton.

66/8. Fumaria officinalis L. Frequent.

70/1. Sinapis arvensis L.

70/2. S. alba L. Oakham.

*72/1. Diplotaxis muralis (L.) DC. Locally common on ballast and brickwork.

74/1. Raphanus raphanistrum L. Frequent.

81/1. Cardaria draba (L.) Desv. Luffenham; Oakham; Essendine.

84/1. Thlaspi arvense L. Occasional.

* 84/3. T. PERFOLIATUM L. Small persistent colony on embankment at Luffenham.

86/1. CAPSELLA BURSA-PASTORIS. (L.) Medic.

95/1-3. EROPHILA VERNA agg. Common on ballast. *E. verna* (L.) Chevall has been identified from one gathering.

96/1. ARMORACIA RUSTICANA Gaertn., Mey. & Scherb. Frequent.

97/1. CARDAMINE PRATENSIS L. Occasional on embankments where drainage is poor.

97/5. C. HIRSUTA L. Occasional on ballast.

98/1. BARBAREA VULGARIS R.Br. Occasional in ditches and conduits.

100/3. ARABIS CAUCASICA Willd. Brickwork, Manton.

102/1. NASTURTIUM OFFICINALE R.Br. (*Rorippa nasturtium-aquaticum* (L.) Hayek). Occasional in ditches.

102/1 × 2. N. × STERILE (Airy Shaw) Oefelein (*Rorippa* × *sterilis* Airy Shaw). Ditch, South Luffenham.

†102/3. RORIPPA SYLVESTRIS (L.) Bess. Oakham; Ashwell.

105/1. ERYSIMUM CHEIRANTHOIDES L. Oakham.

107/1. ALLIARIA PETIOLATA (Bieb.) Cavara & Grande.

108/1. SISYMBRIUM OFFICINALE (L.) Scop.

108/4. S. ORIENTALE L. Luffenham.

†109/1. ARABIDOPSIS THALIANA (L.) Heynh. Common on ballast.

112/1. RESEDA LUTEOLA L. Seaton.

112/2. R. LUTEA L. Frequent.

113/1. VIOLA ODORATA L. Frequent.

113/4. V. RIVINIANA Reichb. Pilton.

114/1. POLYGALA VULGARIS L. Ryhall.

115/5. HYPERICUM PERFORATUM L.

115/8. H. TETRAPTERUM Fr. Ditch at South Luffenham.

* 115/13. H. MONTANUM L. South Luffenham, few plants.

118/1. HELIANTHEMUM NUMMULARIUM (L.) Mill. (*H. chamaecistus* Mill.). Essendine; Luffenham.

123/1. SILENE VULGARIS (Moench) Garcke.

123/13. S. DIOICA (L.) Clairv., and *S. alba* × *dioica* hybrids. Occasional in shade.

123/14. S. ALBA (Mill.) E. H. L. Krause.

* 129/1. SAPONARIA OFFICINALIS L. Ashwell.

131/7. CERASTIUM FONTANUM Baumg. subsp. TRIVIALE (Link) Jalas (*C. holosteoides* Fr.).

131/8. C. GLOMERATUM Thuill.

* 131/10. C. DIFFUSUM Pers. (*C. atrovirens* Bab.). Manton, rare.

†131/12. C. SEMIDECANDRUM L. Ryhall; Belmesthorpe.

133/2. STELLARIA MEDIA (L.) Vill.

133/3. S. PALLIDA (Dum). Piré. Thorpe-by-Water, on masonry.

133/5. S. HOLOSTEA L. Frequent.

133/7. S. GRAMINEA L.

136/2. SAGINA APETALA Ard. subsp. APETALA (*S. ciliata* Fr.). Luffenham.

136/4. S. PROCUMBENS L. Common on brickwork and ballast.

* 137/4. MINUARTIA HYBRIDA (Vill.) Schischk. Occasional on brickwork and ballast.

140/1. MOEHRINGIA TRINERVIA (L.) Clairv. Frequent.

141/1. ARENARIA SERPYLLIFOLIA L. } Equally common on ballast and brickwork.
141/2. A. LEPTOCLADOS (Reichb.) Guss. }

156/2. ATRIPLEX PATULA L. Garden weed at stations.

162/2. × 1. TILIA × VULGARIS Hayne (*T. europaea* auct.). Pilton, planted.

163/1. MALVA MOSCHATA L. Frequent.

163/2. M. SYLVESTRIS L. Common near stations.

163/4. M. NEGLECTA Wallr. South Luffenham, small colony.

166/4. LINUM CATHARTICUM L.

168/1. GERANIUM PRATENSE L.

168/10. G. COLUMBINUM L. Essendine; Belmesthorpe.

168/11. G. DISSECTUM L.

168/13. G. MOLLE L.

168/16. G. ROBERTIANUM L.

169/3. ERODIUM CICUTARIUM (L.) L'Hérit. Oakham, rare.

173/1. ACER PSEUDOPLATANUS L. Frequent, particularly as seedlings.

173/3. A. CAMPESTRE L.

179/1. RHAMNUS CATHARTICUS L. Frequent.

187/1. ULEX EUROPAEUS L. Occasional.

188/1. SAROTHAMNUS SCOPARIUS (L.) Wimm. ex Kock. Occasional on the Uppingham branch, spreading from specimens originally planted.

189/1. ONONIS REPENS L. Pilton to Ketton, common; Essendine.

189/2. O. SPINOSA L. Essendine.

190/2. MEDICAGO SATIVA L. Essendine.

190/3. M. LUPULINA L.

†191/1. MELILOTUS ALTISSIMA Thuill. Frequent.

†191/2. M. OFFICINALIS (L.) Pall. Occasional.

†191/3. M. ALBA Medic. Frequent.

* 191/4. M. INDICA (L.) All. Oakham. rare,

192/2. TRIFOLIUM PRATENSE L.

192/4. T. MEDIUM L. Frequent.

192/17. T. HYBRIDUM L. Oakham; Seaton; Ryhall.

192/18. T. REPENS L.

192/21. T. CAMPESTRE Schreb. Frequent.

192/23. T. DUBIUM Sibth.

193/1. ANTHYLLIS VULNERARIA L. Manton; Luffenham; Essendine.

195/1. LOTUS CORNICULATUS L.

195/2. L. TENUIS Waldst. & Kit. ex Willd. Ryhall.

195/3. L. ULIGINOSUS Schkuhr. Local, where drainage is poor.

200/3. ASTRAGALUS GLYCYPHYLLOS L. Belmesthorpe.

205/1. ONOBRYCHIS VICIIFOLIA Scop. Ryhall, rare.

206/1. VICIA HIRSUTA (L.) Gray.

†206/2. V. TETRASPERMA (L.) Schreb. Frequent.

206/4. V. CRACCA L.

206/11. V. SEPIUM L.

206/15. V. SATIVA L. Both subsp. SATIVA and subsp. ANGUSTIFOLIA (L.) Gaud. are frequent.

* 207/2. LATHYRUS NISSOLIA L. Mineral line, Pilton.

207/4. L. PRATENSIS L.

207/5. L. TUBEROSUS L. Ryhall, one colony.

†207/8. L. LATIFOLIUS L. Established in a number of places, but never far from stations.

210/1. FILIPENDULA VULGARIS Moench. Pilton to Luffenham; Essendine.

210/2. F. ULMARIA (L.) Maxim. Common in ditches and where drainage is poor.

211/6. RUBUS IDAEUS L. South Luffenham, seedlings on ballast.

211/9. R. CAESIUS L. Oakham; Glaston; Essendine.

211/11. R. FRUTICOSUS Lagg. Brambles of Sect. Triviales P. J. Muell. and *R. ulmifolius* Schott are common in hedgerows; the only other segregate so far identified is *R. echinatus* Lindl., from a single locality.

212/3. POTENTILLA STERILIS (L.) Garcke. Common.

212/5. P. ANSERINA L. Common.

* 212/6. P. ARGENTEA L. Oakham, one small colony.

212/13. P. ERECTA (L.) Räusch. Well established in a few places.

†212/14. P. ANGLICA Laichard. Glaston, a well established colony. All material examined critically has proved to be a hybrid, probably *P. anglica* × *erecta*.

212/15. P. REPTANS L. Common.

215/1. FRAGARIA VESCA L. Locally common, but in some places replaced by *F.* × *ananassa*.

†215/3. F. × ANANASSA Duchesne. Caldecott to Seaton; Uppingham branch; Manton; Oakham; Pilton; Ketton; numerous well established colonies.

216/1. GEUM URBANUM L. Common.

218/1. AGRIMONIA EUPATORIA L. Frequent.

221/1. APHANES ARVENSIS L. *sensu stricto*. Occasional.

222/1. SANGUISORBA OFFICINALIS L. Frequent.

223/1. POTERIUM SANGUISORBA L. Frequent, east of Seaton.

225/1. ROSA ARVENSIS Huds. Frequent.

225/8-10. R. CANINA agg. Common; no work has been done on the segregates to be found on railways, but *R. dumetorum* Thuill. var. *gabrielis* (F. Gér.) R. Kell. is reported from Belmesthorpe.

226/1. PRUNUS SPINOSA L. Common.

226/3. P. CERASIFERA Ehrh. Ketton, planted hedge.

226/4. P. AVIUM (L.) L. Pilton, single sapling.

227/4. COTONEASTER MICROPHYLLUS Wall. ex Lindl. Belmesthorpe, several plants on ballast.

229/1. CRATAEGUS LAEVIGATA (Poir.) DC. (*C. oxycanthoides* Thuill.). Thorpe-by-Water; Glaston; Wing.

229/2. C. MONOGYNA Jacq., and hybrids with *C. laevigata*. Common.

232/1. SORBUS AUCUPARIA L. Planted at stations, occasionally seeding.

232/5. S. ARIA (L.) Crantz. Bisbrooke, one plant.

234/1. MALUS SYLVESTRIS Mill. Frequent.

235/8. SEDUM ACRE L. Frequent on brickwork; occasional on ballast.

239/9. SAXIFRAGA GRANULATA L. Uppingham; Bisbrooke; Morcott; Pilton.

246/1. RIBES SYLVESTRE (Lam.) Mert. & Koch. Occasional.

246/6. R. UVA-CRISPA L. South Luffenham, seedlings on ballast.

254/1. EPILOBIUM HIRSUTUM L.

254/2. E. PARVIFLORUM Schreb. Occasional.

254/3. E. MONTANUM L. Frequent.

†254/6. E. ADENOCAULON Hausskn. Common on ballast.

254/7. E. TETRAGONUM L. (*E. Adnatum* Griseb.). Oakham; Manton.

255/1. E. ANGUSTIFOLIUM L. (*Chamaenerion angustifolium* (L.) Scop.).

256/1. OENOTHERA BIENNIS L. Ketton, ballast of dismantled siding.

265/1. SWIDA SANGUINEA (L.) Opiz (*Thelycrania sanguinea* (L.) Fourr.) Frequent.

268/1. HEDERA HELIX L.

273/1. CHAEROPHYLLUM TEMULENTUM L. Frequent.

274/2. ANTHRISCUS SYLVESTRIS (L.) Hoffm.

277/1. TORILIS JAPONICA (Houtt.) DC.

285/2. APIUM NODIFLORUM (L.) Lag. Occasional in ditches.

293/1. CONOPODIUM MAJUS (Gouan.) Loret. Frequent.

294/1. PIMPINELLA SAXIFRAGA L. Frequent east of Manton and Seaton.

301/1. AETHUSA CYNAPIUM L. Occasional.

303/1. SILAUM SILAUS (L.) Schinz & Thell. Occasional east of Manton.

310/1. PASTINACA SATIVA L.

311/1. HERACLEUM SPHONDYLIUM L.

314/1. DAUCUS CAROTA L.

315/1. BRYONIA DIOICA Jacq.

318/1. MERCURIALIS PERENNIS L. Occasional.

319/2. EUPHORBIA LATHYRUS L. Thorpe-by-Water, garden escape.

319/10. E. PEPLUS L. Occasional on disturbed ground after drainage works.

320/9. POLYGONUM PERSICARIA L. Occasional on disturbed ground.

320/10. P. LAPATHIFOLIUM L. Ketton.

320/19. P. CUSPIDATUM Sieb. & Zucc. Morcott, garden escape.

320/R. RHEUM sp. Oakham; Essendine; persisting for years after abandonment of lineside gardens.

325/1. RUMEX ACETOSELLA L. *sensu lato*. Frequent on ballast, and on embankments after burning. *R. acetosella s.s.* confirmed in three instances.

325/2. R. ACETOSA L.

325/11. R. CRISPUS L.

325/12. R. OBTUSIFOLIUS L.

325/14. R. SANGUINEUS L. var. VIRIDIS Sibth.

328/2. URTICA DIOICA L.

330. ULMUS spp. In many lineside hedges, and in scrub at tunnel mouths. No critical work has yet been done.

335/1. BETULA PENDULA Roth. Occasional in scrub on embankments and at tunnel mouths.

335/2. B. PUBESCENS Ehrh. Wing tunnel mouth, in scrub.

341/3. QUERCUS ROBUR L.

342/3. POPULUS TREMULA L. Frequent, Seaton to Manton and Manton to Luffenham.

343/2. SALIX ALBA L. Occasional.

343/4. S. FRAGILIS L. Occasional.

343/9. S. VIMINALIS L. and hybrids. Glaston.

343/11. S. CAPREA L. Frequent.

343/12. S. CINEREA L. subsp. OLEIFOLIA Macreight (subsp. *atrocinerea* (Brot.) Silva & Sobrinho).

356/1. CALLUNA VULGARIS (L.) Hull. Manton, small colony.

367/3. PRIMULA VERIS L.

367/5. P. VULGARIS Huds. Occasional in shade.

* 374/1. SAMOLUS VALERANDI L. Belmesthorpe, ditch.

376/1. FRAXINUS EXCELSIOR L.

377/1. SYRINGA VULGARIS L. Wing; Pilton.

378/1. LIGUSTRUM VULGARE L.

382/4. CENTAURIUM ERYTHRAEA Rafn. Luffenham, rare.

392/2 × 1. SYMPHYTUM × UPLANDICUM Nyman. Occasional, Oakham to Egleton.

400/8. MYOSOTIS ARVENSIS (L.) Hill.

400/10. M. RAMOSISSIMA Rochel.

403/1. ECHIUM VULGARE L. Ketton.

405/1. CONVOLVULUS ARVENSIS L.

406/1. CALYSTEGIA SEPIUM (L.) R.Br.

406/3. C. SILVATICA (Kit.) Griseb. South Luffenham.

409/1. LYCIUM HALIMIFOLIUM Mill. Manton, in scrub.

413/1. SOLANUM DULCAMARA L.

413/t. S. TUBEROSUM L. Occasionally persisting after dumping.

416/1. VERBASCUM THAPSUS L. Frequent.

418/1. ANTIRRHINUM MAJUS L. Brickwork, Manton station and Glaston tunnel south portal.

420/4. LINARIA VULGARIS Mill.

†421/1. CHAENORHINUM MINUS (L.) Lange. Common on ballast.

429/1. DIGITALIS PURPUREA L. Wing, rare.

430/7. VERONICA CHAMAEDRYS L.

430/15. V. ARVENSIS L. Common on ballast, occasional on brickwork and embankments.

433/2. Rhinanthus minor L. Manton; Glaston; Wing; all where drainage is poor.

435/13. Euphrasia nemorosa (Pers.) Wallr. Luffenham, spreading from adjacent quarry.

436/1. Odontites verna (Bellardi) Dumort. Frequent. Subsp. *verna* is the commoner in the county, but the railway colonies have not been studied critically.

440/6. Orobanche elatior Sutton. Ryhall, on *Centaurea scabiosa*.

* 440/8. O. minor Sm. Oakham, on *Trifolium pratense*.

447/1. Origanum vulgare L. Luffenham to Ketton; Essendine.

452/1. Acinos arvensis (Lam.) Dandy. Essendine.

453/1. Clinopodium vulgare L. Common east of Manton.

* 455/1. Salvia verticillata L. Oakham, two colonies.

455/4. S. horminoides Pourr. Essendine, single colony.

457/1. Prunella vulgaris L.

458/1. Betonica officinalis L. Pilton, rare.

459/7. Stachys sylvatica L.

460/1. Ballota nigra L.

462/1. Lamium amplexicaule L. Essendine, only on dismantled trackway after removal of boundary fence.

462/4. L. purpureum L. Station gardens.

462/5. L. album L.

467/1. Glechoma hederacea L.

472/1. Plantago major L.

472/2. P. media L. Frequent east of Manton.

472/3. P. lanceolata L.

†475/3. Campanula rapunculoides L. Ashwell, large colony.

475/6. C. glomerata L. Pilton to Luffenham, locally common.

†475/7. C. rotundifolia L. Frequent.

476/1. Legousia hybrida (L.) Delarb. Luffenham, on ballast.

481/1. Sherardia arvensis L. On ballast, Luffenham and Ryhall.

485/3. Galium album Mill. subsp. album (*G. mollugo* auct., non L.). Common. Oakham and Luffenham.

485/4. G. verum L.

485/5. G. saxatile L. Glaston, with *Deschampsia flexuosa*.

485/12. G. aparine L.

487/2. Sambucus nigra L.

491/3. Lonicera periclymenum L.

494/1. Valerianella locusta (L.) Betcke. Embankments and station yards, frequent.

495/1. Valeriana officinalis L. Oakham; Belmesthorpe.

495/3. V. dioica L. Ashwell, marsh below embankment.

497/1. Dipsacus fullonum L. Frequent.

498/1. Knautia arvensis (L.) Coult.

500/1. Succisa pratensis Monech. Pilton.

506/1. SENECIO JACOBAEA L.

506/2. S. AQUATICUS Hill. Manton, in a culvert.

†506/3. S. ERUCIFOLIUS L. Common early invader of ballast after effect of weed killer has declined.

†506/4. S. SQUALIDUS L.

506/6. S. SYLVATICUS L. Wing, in scrub.

506/7. S. VISCOSUS L. Frequent on ballast.

506/8. S. VULGARIS L. Weed in station gardens.

508/1. TUSSILAGO FARFARA L.

518/2. SOLIDAGO ALTISSIMA L. (*S. canadensis* auct., non L.) Oakham, one large clump on site of former siding.

†521/1. ERIGERON ACRE L. Locally common on ballast of disused lines. E. ANNUUS was provisionally identified as a casual at Oakham.

†522/1. CONYZA CANADENSIS (L.) Cronq. Oakham, common; also seen at Wing, Essendine, Seaton and Luffenham.

524/1. BELLIS PERENNIS L. Common in station gardens, occasional elsewhere.

528/1. ACHILLEA MILLEFOLIUM L.

531/1. TRIPLEUROSPERMUM MARITIMUM (L.) Koch subsp. INODORUM (L.) Hyland. ex Vaarama. Station garden weed, occasional elsewhere.

532/2. MATRICARIA MATRICARIOIDES (Less.) Porter. Stations, common.

533/2. CHRYSANTHEMUM LEUCANTHEMUM L.

533/3. C. MAXIMUM Ramond. Oakham, established garden escape.

533/4. C. PARTHENIUM (L.) Bernh. Stations.

533/5. C. VULGARE (L.) Bernh. Thorpe-by Water; Oakham; Barrowden; lineside banks far from houses.

535/1. ARTEMISIA VULGARIS L. Frequent.

535/6. A. ABSINTHIUM L. Rare in station yards and sidings at Ashwell, Oakham and Seaton; embankment, Glaston.

538/1. ARCTIUM LAPPA L. Luffenham, station yard.

538/4. A. MINUS Bernh. Frequent. *A. nemorosum* Lej. is common in Rutland but there is no railway record.

539/3. CARDUUS NUTANS L. Ryhall; Ketton; Luffenham.

539/4. C. ACANTHOIDES L.

540/1. CIRSIUM ERIOPHORUM (L.) Scop. Locally common, Ketton to Luffenham.

540/2. C. VULGARE (Savi) Ten.

540/3. C. PALUSTRE (L.) Scop.

540/4. C. ARVENSE (L.) Scop.

540/6. C. ACAULE Scop. (*C. acaulon* (L.) Scop.). Pilton; Luffenham; Belmesthorpe; Essendine.

544/1. CENTAUREA SCABIOSA L. Common east of Seaton and Manton.

544/6. C. NIGRA L.

547/1. LAPSANA COMMUNIS L.

549/1. HYPOCHOERIS RADICATA L.

550/1. LEONTODON AUTUMNALIS L.

550/2. L. HISPIDUS L.

551/1. PICRIS ECHIOIDES L. Belmesthorpe.

†551/2. P. HIERACIOIDES L. Pilton to Luffenham; Ryhall.

552/1. TRAGOPOGON PRATENSIS L.

†554/1. LACTUCA SERRIOLA L. Ashwell; Seaton; Manton; Wing.

†554/2. L. VIROSA L. Frequent.

555/1. MYCELIS MURALIS (L.) Dumort. Ashwell, on masonry.

556/2. SONCHUS ARVENSIS L. Occasional.

556/3. S. OLERACEUS L. Station garden weed.

556/4. S. ASPER (L.) Hill.

†558/1. HIERACIUM MURORUM L. agg. Common. The following segregates have been determined by P. D. Sell:—
H. DIAPHANUM Fr. Ashwell; Egleton; Glaston.
H. STRUMOSUM (W. R. Linton) A. Ley. Oakham.
H. SALTICOLA (Sudre) Sell & West. Oakham.
H. VAGUM Jord. Oakham.

558/2(1). PILOSELLA OFFICINARUM C. H. & F. W. Schultz subsp. OFFICINARUM (*Hieracium pilosella* L.).

559/2. CREPIS VESICARIA L. subsp. TARAXACIFOLIA (Thuill.) Thell. Frequent.

559/6. C. CAPILLARIS (L.) Wallr.

560/1. TARAXACUM OFFICINALE Weber *sensu lato.*

560/4. T. LAEVIGATUM (Willd.) DC. *sensu lato.* Ballast and brickwork, Manton; Luffenham; Essendine.

605/7. JUNCUS BUFONIUS L. Essendine, late coloniser of dismantled road bed.

605/8. J. INFLEXUS L. Frequent.

605/9. J. EFFUSUS L. Glaston, marshy patch.

605/19. J. ARTICULATUS L. Ashwell, ditch.

607/5. ALLIUM VINEALE L. Oakham, spoil heaps in dismantled siding.

622/1. TAMUS COMMUNIS L.

643/1. DACTYLORHIZA FUCHSII (Druce) Soó (*Dactylorchis fuchsii* (Druce) Vermeul.). Belmesthorpe; Pilton.

663/31. CAREX FLACCA Schreb.

663/32. C. HIRTA L.

663/50. C. NIGRA (L.) Reichard. Belmesthorpe.

663/67. C. SPICATA Huds. Thorpe-by-Water; Seaton; Ketton.

665/1. PHRAGMITES AUSTRALIS (Cav.) Steud. (*P. communis* Trin.). Manton; Glaston.

670/1. FESTUCA PRATENSIS Huds. Occasional, Seaton to Manton.

670/2. F. ARUNDINACEA Schreb. Oakham; Seaton.

670/6. F. RUBRA L.

670/8. F. OVINA L. Locally common.

670/1 × 671/1. × FESTULOLIUM LOLIACEUM (Huds.) P. Fourn. Seaton, one plant on ballast.

671/1. LOLIUM PERENNE L.

†672/2. VULPIA BROMOIDES (L.) Gray. Frequent on ballast.

†672/3. V. MYUROS (L.) C. C. Gmel. Occasional on ballast.

†674/1. CATAPODIUM RIGIDUM (L.) C. E. Hubbard. Frequent on brickwork; occasional on ballast.

676/1. POA ANNUA L. Stations.

676/6. P. NEMORALIS L. Oakham, in scrub.

†676/9. P. COMPRESSA L. On ballast and in station yards, Oakham, Manton. Ryhall.

676/10. P. PRATENSIS L.

676/11. P. ANGUSTIFOLIA L. On ballast and in station yards, Manton, Seaton, Luffenham.

676/13. P. TRIVIALIS L.

678/1. DACTYLIS GLOMERATA L.

683/5. BROMUS STERILIS L.

683/10-12. B. MOLLIS Lagg. Common. Most records are of *B. mollis* L. *ss.*, but *B. thominii* Hardouin occurs at Oakham.

684/1. BRACHYPODIUM SYLVATICUM (Huds.) Beauv. Frequent in scrub.

684/2. B. PINNATUM (L.) Beauv. Frequent east of Manton.

685/3. AGROPYRON REPENS (L.) Beauv.

687/2. HORDEUM MURINUM L. Stations and yards.

691/1. TRISETUM FLAVESCENS (L.) Beauv. Frequent.

693/1. HELICTOTRICHON PRATENSE (L.) Pilg. Barrowden.

693/2. H. PUBESCENS (Huds.) Pilg. Oakham; Ryhall.

694/1. ARRHENATHERUM ELATIUS (L.) Beauv. ex J. & C. Presl.

695/1. HOLCUS LANATUS L.

696/1. DESCHAMPSIA CESPITOSA (L.) Beauv.

* 696/3. D. FLEXUOSA (L.) Trin. Cuttings at Glaston, Seaton and Uppingham.

* 697/1. AIRA PRAECOX L. Rare on ballast and embankments, Glaston and Oakham.

† 697/2. A. CARYOPHYLLEA L. Frequent on ballast.

700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. Pilton.

701/3. AGROSTIS TENUIS Sibth. Frequent.

701/4. A. GIGANTEA Roth. Occasional.

701/5. A. STOLONIFERA L. Frequent.

* 702/1. APERA SPICA-VENTI (L.) Beauv. Luffenham station, casual.

702/2. A. INTERRUPTA (L.) Beauv. Luffenham, station.

707/1. PHLEUM BERTOLONII DC.

707/2. P. PRATENSE L.

708/1. ALOPECURUS MYOSUROIDES Huds. Manton station garden.

708/2. A. PRATENSIS L.

712/1. ANTHOXANTHUM ODORATUM L. Frequent.

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Addenda

Table 1. Dismantling of the closed sections, nos. 5 & 6, was carried out in 1967 and 1968. Manton station buildings and platforms have also been removed.

SECTION 10, STAMFORD BRANCH. During 1967 and 1968 the part of this section from BELMESTHORPE to ESSENDINE junction has developed an interesting intermediate type of limestone grassland flora in which some of the more usual railway plants, e.g. *Melilotus* spp. are gradually giving way to invading grassland plants. In 1968 there was a profuse growth on the former road bed of *Euphrasia nemorosa*, previously unrecorded in the vicinity, and extending for over half a mile (800m.).

List of Species

256/1. Oenothera biennis L. Add Essendine.

435/13. Euphrasia nemorosa (Pers.) Wallr. Add Belmesthorpe to Essendine.

506/4 × 6. Senecio squalidus × viscosus. Specimens which are almost certainly of this hybrid have been found with both parents on ballast at Barrowden.

THE FLORA OF INISHBOFIN AND INISHSHARK

D. A. WEBB and J. HODGSON

INTRODUCTION

Inishbofin and Inishshark are two adjacent islands off the north-western coast of Co. Galway, Ireland, separated from each other by a strait ¾ of a mile wide, and from the mainland by 3½ miles of open sea. Inishbofin has an area of just over 3½ square miles; Inishshark of rather less than a square mile. There are a few other islets in the group, all less than 100 acres in area, but only one of them (Inishgort, to the S.E. of Inishshark) was visited for the purposes of this survey. The islands are composed almost entirely of Silurian slates and shales, and rise to a height of 292 feet (Bofin) and 326 feet (Shark). Some patches of glacial drift are, or have been farmed, but the greater part of the islands has the rock covered only by a thin layer of peaty soil, which is continually being cut for fuel. There are a very few small bogs, where the peat is deeper, and these, too, have been extensively cut. Most of the coast is rocky, rising in places to form impressive cliffs, but there is a good beach on the E. coast of Bofin. Bofin retains a population of small farmers and lobster-fishers, augmented in summer by day-trippers and visitors to the small hotel. Shark was evacuated in 1961.

The first attempt at a systematic survey of the flora of these islands was made by More and Barrington in mid-August, 1875; they spent four days on Bofin and one on Shark and noted 303 species (More, 1876). No species was seen on Shark which was not also seen on Bofin, but their list does not indicate which species were found on Shark. In 1911 Praeger, rightly suspecting that More's list was incomplete, spent three days on Bofin in late July. He added 82 species (Praeger, 1911*b*) and failed to find only 12 from More's list.

In 1965 D.A.W., feeling that records more than 50 years old were not adequate for the projected *Flora of Connemara and the Burren*, spent 3 days on Bofin in early June, with a party of students. Independently, and without knowledge of this visit, J.H., as a member of an expedition from University College, Bangor, spent a month on Inishshark in July-August of the same year and also paid hasty visits to Bofin and Inishgort. Collation of our lists during 1966 revealed some discrepancies, and in order to resolve these and to look for some species for which his 1965 visit had been too early, D.A.W. returned to Bofin for 3 days in late July, 1967. Miss M. Scannell and Miss A. Folan visited Bofin in May, 1967, primarily to collect algae and bryophytes, but noted also some vascular plants; a few of their records are incorporated in the lists below.

The result of our visits has been to establish a list of some 370 species for the archipelago. We have confirmed all but 33 of the species on Praeger's list (excluding *Rubi*) and one of the species noted by More but not seen by Praeger, and we have added a further 36 species not seen by our predecessors. Of these 22 are entirely new, and 14 are due to the recognition today of segregates which were not recognised as species in 1911.

CHARACTER OF THE VEGETATION

The most striking feature of the vegetation is the complete absence of native trees and shrubs more than about a foot in height; even planted shrubs are few and stunted. There is, in consequence, an almost complete absence of shade and shelter. The farmed land is almost entirely under grass; cultivation is restricted to potato-patches and a very few small fields of cereals. Much of the surface is covered by heath, with semi-prostrate *Calluna* or *Nardus* dominant; there are also some patches of bog and marsh. On the cliff-tops, especially towards the west, there is a very fine development of *Plantago*-sward (Tansley, 1939, p. 900), which is stabilized not only by extreme exposure to wind but also by a considerable population of rabbits. The other submaritime communities are fragmentary, there being no real salt-marsh and only a very small development of sand-dunes. There are six small lakes on Bofin, of which one is brackish. For a more detailed description see Praeger (1911*b*); it should be noted, however, that he, following More, has transposed the names of Loughnagrooaun and Lough Gowlanagower. We found *Eriocaulon* abundant in the latter and *Isoetes* in the former; it seems unlikely that these have changed places since 1911.

LIST OF SPECIES

In the following lists the order and nomenclature follows that of Dandy (1958), except in a few cases where nomenclature follows that used in *Flora Europaea* (Tutin *et al.* 1964 and 1968) or is in accordance with editorial policy. In these cases the name used by Dandy is given in parentheses. Hybrids have not been included unless they are fertile or have powers of vegetative reproduction sufficient to establish themselves as permanent members of the flora. Planted shrubs are included only if they are found far from houses.

The letters after each name indicate the authors who have seen it on the islands, M, P, W and H indicating respectively More, Praeger, Webb and Hodgson; (!) stands for (MPWH) and indicates that it was seen by all four. Species found on Shark and/or Gort as well as Bofin are marked with an asterisk (*); those seen on Shark alone with a dagger (†). Species without any distinguishing mark have been seen only on Bofin. Notes on abundance and rarity are to be interpreted by the standards of western Ireland.

(1). OLD RECORDS CONFIRMED

* 2/1. SELAGINELLA SELAGINOIDES (L.) Link. (PH). Locally frequent on Shark; not rediscovered on Bofin where, if still present, it must be very rare.

3/2. ISOETES SETACEA Lam. (*I. echinospora* Durieu). (MPW).

4/5. EQUISETUM FLUVIATILE L. (!).

4/9. E. ARVENSE L. (!).

5/1. OSMUNDA REGALIS L. (!).

7/2. HYMENOPHYLLUM WILSONII Hook. (PW). Rare; but as well as on bluffs near Church Lough, it grows near the west end of Bofin (Miss A. Folan).

* 8/1. PTERIDIUM AQUILINUM (L.) Kuhn. (!).

* 13/1. BLECHNUM SPICANT (L.) Roth. (!).

* 15/1. ASPLENIUM ADIANTUM-NIGRUM L. (!). Unusually abundant.

* 15/4. A. MARINUM L. (!). On Shark this species grows on walls and rocks at some distance from the sea.

15/7. A. RUTA-MURARIA L. (MPW). Rare.

* 18/1. ATHYRIUM FILIX-FEMINA (L.) Roth. (!).

* 21/1. DRYOPTERIS FILIX-MAS (L.) Schott. (!).

* 21/7. D. DILATATA (Hoffm.) A. Gray. (!).

21/8. D. AEMULA (Ait.) Kuntze. (MPW). Rare.

25/1. POLYPODIUM VULGAREL. (!). Most of the plants were very dwarf, with few fertile fronds, and were difficult to assess. Subsp. *vulgare* (tetraploid) seems to predominate, but at least one plant from a wall north-east of Bofin harbour was, by its annulus-count, referable to subsp. *prionodes* Rothm. (hexaploid). Miss Scannell collected an apparent hybrid between the two subspecies.

34/1. JUNIPERUS COMMUNIS L. subsp. NANA Syme. (MPW). Rare.

36/1. CALTHA PALUSTRIS L. (PW).

* 46/1. RANUNCULUS ACRIS L. (!).

* 46/2. R. REPENS L. (!).

46/3. R. BULBOSUS L. (MPW). Only on blown sand.

* 46/12. R. FLAMMULA L. (!).

* 46/16. R. HEDERACEUS L. (!).

46/21. R. TRICHOPHYLLUS Chaix. (MPW).

46/23. R. BAUDOTII Godr. (MPW).

* 46/24. R. FICARIA L. (PWH). W's 1965 visit was early enough to show that it is widespread and abundant on Bofin in open grassland.

56/1. NUPHAR LUTEA (L.) Sm. (!).

66/4. FUMARIA BASTARDII Bor. (MPW).

67/3. BRASSICA RAPA L. (!).

67/4. B. NIGRA (L.) Koch. (MPW).

* 70/1. SINAPIS ARVENSIS L. (!).

70/2. S. ALBA L. (MPW). Rare.

77/1. CAKILE MARITIMA Scop. (MPW). Rare.

* 80/1. CORONOPUS SQUAMATUS (Forsk.) Aschers. (!). Plentiful, not only as a ruderal, but also as a garden weed.

80/2. C. DIDYMUS (L.) Sm. (!). Abundant, and, like the preceding, common as a weed.

* 86/1. CAPSELLA BURSA-PASTORIS (L.) Medic. (!).

* 88/1. COCHLEARIA OFFICINALIS L. (!). In addition to normal specimens some dwarf plants rather suggestive of *C. scotica* Druce were seen on Bofin and Shark; it is difficult to name such plants from extremely exposed conditions in W. Ireland without cultivation. Some of Praeger's records of *C. groenlandica* for Western Ireland probably refer to dwarf forms of *C. officinalis*.

88/5. C. DANICA L. (MPW). Rare; seen only on the ruined church on Bofin.

* 97/1. CARDAMINE PRATENSIS L. (!).

97/4. C. FLEXUOSA With. (PW). Rare.

100/5. ARABIS BROWNII Jord. (PW). Rare.

102/1. NASTURTIUM OFFICINALE R.Br. (*Rorippa nasturtium-aquaticum* (L.) Hayek). (!). Normal plants occur by streams leading into the inner harbour on Bofin; in drains E. of the ruined church the species occurs mostly as var. *siifolium*, with stems up to 1·5 m high and 20 mm in diameter, and with leaves 25 cm long.

* 113/4. VIOLA RIVINIANA Reichb. (!).

113/6. V. CANINA L. (MP). Overlooked by W and H, but collected by Miss Scannell on stony ground near the centre of Bofin.

113/9. V. PALUSTRIS L. (!).

* 114/2. POLYGALA SERPYLLIFOLIA Hose. (!). Less common than one would expect from the terrain.

115/1. HYPERICUM ANDROSAEMUM L. (MPW). In several places, but only as isolated, small plants.

* 115/8. H. TETRAPTERUM Fr. (!).

* 115/9. H. HUMIFUSUM L. (!). Locally abundant on banks.

* 115/11. H. PULCHRUM L. (!).

* 115/14. H. ELODES L. (!).

* 117/1. TUBERARIA GUTTATA (L.) Fourr. subsp. BREWERI (Planch.) E. F. Warb. (!). Widespread on the higher parts of both islands, on thin peat with rock-outcrops, but rather thinly scattered and not as abundant as Praeger's references would imply.

122/1. ELATINE HEXANDRA (Lapierre) DC. (MPW).

* 123/2. SILENE VULGARIS (Moench) Garcke subsp. MARITIMA With. A. & D. Löve (S. *maritima* With.). (!).

124/3. LYCHNIS FLOS-CUCULI L. (MPW).

* 131/7. CERASTIUM FONTANUM Baumg. subsp. TRIVIALE (Link) Jalas (*C. holosteoides* Fr.). (!).

* 131/8. C. GLOMERATUM Thuill. (!). Abundant on Shark, on cliff-tops as well as on disturbed ground.

131/10. C. DIFFUSUM Pers. (*C. atrovirens* Bab.). (MPW).

* 133/2. STELLARIA MEDIA (L.) Vill. (!).

* 133/8. S. ALSINE Grimm. (PWH).

* 136/3. SAGINA MARITIMA Don. (PWH). Especially abundant on Shark.

* 136/4. S. PROCUMBENS L. (!).

* 136/9. S. SUBULATA (Sw.) C. Presl. (!). Rare.

* 139/1. HONKENYA PEPLOIDES (L.) Ehrh. (!). On Bofin and Gort, but not seen on Shark.

141/1. ARENARIA SERPYLLIFOLIA L. (MPW).

142/1. SPERGULA ARVENSIS L. (MPW).

* 143/3. SPERGULARIA RUPICOLA Lebel ex Le Jolis. (!).

* 149/1. MONTIA FONTANA L. (!). Abundant. A plant collected by Miss Scannell appears to be referable to subsp. *chondrosperma* (Fenzl) Walters.

* 154/4. CHENOPODIUM ALBUM L. (!). Now very rare on both islands; in many parts of Ireland this species seems to be giving place to *Atriplex patula*.

* 155/1. BETA VULGARIS L., subsp. MARITIMA (L.) Arcangeli. (PWH). Noted by Praeger on sandy and gravelly shores on the S. & E. sides of Bofin, but frequent also on cliffs at the W. end of both islands.

* 156/2. ATRIPLEX PATULA L. (!).

* 156/3. A. HASTATA L. (PWH).

* 156/4. A. GLABRIUSCULA Edmondst. (!).

159/1. SALSOLA KALI L. (MPW).

* 166/4. LINUM CATHARTICUM L. (!).

* 167/1. RADIOLA LINOIDES Roth. (!). Remarkably abundant on the N. & W. parts of Bofin, where it often attains to subdominance on eroded, west-facing, peaty slopes.

168/11. GERANIUM DISSECTUM L. (!).

168/13. G. MOLLE L. (MPW).

168/16. G. ROBERTIANUM L. (MPW). The typical plant and not, as indicated by More, var. *purpureum* (Vill.) Forst. (*G. purpureum* Vill.).

169/3. ERODIUM CICUTARIUM (L.) L'Hérit. (!).

170/1. OXALIS ACETOSELLA L. (MPW).

187/1. ULEX EUROPAEUS L. (PW). Only a few planted hedges; not naturalized.

* 192/2. TRIFOLIUM PRATENSE L. (!).

* 192/18. T. REPENS L. (!).

192/21. T. CAMPESTRE Schreb. (PH). Rare.

192/23. T. DUBIUM Sibth. (!).

* 193/1. ANTHYLLIS VULNERARIA L. (!).

* 195/1. LOTUS CORNICULATUS L. (!).

* 206/1. VICIA HIRSUTA (L.) Gray. (!). Rather rare, but probably varying in abundance from year to year.

* 206/4. V. CRACCA L. (!).

* 206/11. V. SEPIUM L. (!).

* 206/14. V. SATIVA L. (!).

* 207/4. LATHYRUS PRATENSIS L. (!). Apparently increasing; now abundant around Church Lough.

207/11. L. MONTANUS Bernh. (PW).

210/2. FILIPENDULA ULMARIA (L.) Maxim. (!).

211/11(104). RUBUS VILLICAULIS Koehlex Weihe & Nees. (MPW). Only 2 specimens of the genus were collected, and both seem to agree best with this species, although one has white flowers and the other pink.

* 212/2. POTENTILLA PALUSTRIS (L.) Scop. (!).

* 212/5. P. ANSERINA L. (!).

* 212/13. P. ERECTA (L.) Räusch. (!).

* 212/14. P. ANGLICA Laichard. (!).

218/1. AGRIMONIA EUPATORIA L. (MPW). Rare; but seen just behind the beach on the E. coast of Bofin, as well as in More's station.

225/4. Rosa pimpinellifolia L. (MPW). Seen only on the S.E. part of Bofin; very dwarf and not flowering.

225/8. R. canina L. (MPW). Rare.

226/1. Prunus spinosa L. (MPW). Rare, and very dwarfed.

* 235/1. Rhodiola rosea L. (*Sedum rosea* (L.) Scop.). (PWH). Local on both islands on steep but not vertical sea-cliffs; abundant where it occurs.

* 235/5. Sedum anglicum Huds. (!). Very abundant on both islands, and on a wide variety of habitats, from bare maritime rocks to bogs and marshes among *Sphagnum* or *Callitriche*.

235/8. S. acre L. (!). On calcareous sands.

239/5. Saxifraga spathularis Brot. (!). Only on one inland cliff.

* 247/1. Drosera rotundifolia L. (!). Abundant, and often very large.

* 249/1. Lythrum salicaria L. (!).

* 250/1. L. portula (L.) D. A. Webb (*Peplis portula* L.). (!). Very frequent on Bofin, but rare on Shark.

254/2. Epilobium parviflorum Schreb. (MPW).

254/3. E. montanum L. (MPH). Recorded without comment by M and P; noted as a weed in hotel garden on Bofin by H in 1965, but searched for here (and elsewhere) by W in 1967 and not found.

* 254/9. E. obscurum Schreb. (!). Abundant.

* 254/10. E. palustre L. (MPH). Reported by M and P as frequent, and recorded by H for both islands; searched for by W in 1967 but not found.

259/4. Myriophyllum alterniflorum DC. (!).

* 262/1. Callitriche stagnalis Scop. (!).

* 262/2. C. platycarpa Kütz. (MH). On account of nomenclatural confusion it is not clear whether Praeger also saw this species.

262/4. C. intermedia Hoffm. (MPW). The only specimen seen was referable to subsp. *pedunculata* (DC.) Clapham.

* 268/1. Hedera helix L. (!).

* 269/1. Hydrocotyle vulgaris L. (!).

272/1. Eryngium maritimum L. (PW). Rare.

282/1. Conium maculatum L. (!).

* 285/2. Apium nodiflorum (L.) Lag. (!).

* 285/4. A. inundatum (L.) Reichb. f. (!).

293/1. Conopodium majus (Gouan) Loret. (PW). Rare.

* 298/1. Crithmum maritimum L. (!).

300/5. Oenanthe crocata L. (PW).

* 307/1. Angelica sylvestris L. (!). Widespread, but much less common, even on cliffs, than might be expected.

* 311/1. Heracleum sphondylium L. (!). Seen by More only on one lawn; noted by Praeger as common, which it is still.

* 314/1. Daucus carota L. (!).

319/9. Euphorbia helioscopia L. (MPW). Noted by M as rare and by P as common, it must now be considered rare again.

319/10. E. peplus L. (PWH). Not seen by M; noted as local by P; now fairly common.

320/1. POLYGONUM AVICULARE L. (MPW).

320/2. P. OXYSPERMUM C. A. Meyer & Bunge ex Ledeb. subsp. RAII (Bab.) D. A. Webb & A. O. Chater (*P. raii* Bab.). (PW). Described by Pas 'luxuriant'; W found none in 1965 and 2 small plants in 1967. The species is decreasing in many parts of Ireland.

* 320/8. P. AMPHIBIUM L. (!).

320/9. P. PERSICARIA L. (!).

320/12. P. HYDROPIPER L. (!).

320/15. POLYGONUM CONVOLVULUS L. (MPW). Now rare; seen in one field at Cloonamore (Bofin).

* 325/1. RUMEX ACETOSELLA L. (!).

* 325/2. R. ACETOSA L. (!).

* 325/11. R. CRISPUS L. (!).

* 325/12. R. OBTUSIFOLIUS L. (!).

* 325/15. R. CONGLOMERATUS Murr. (PWH). P saw only one plant; it is now established on Bofin, though still rather rare; only one plant was seen on Shark.

328/1. URTICA URENS L. (!). Rather rare.

* 328/2. U. DIOICA L. (!).

333/1. MYRICA GALE L. (MPW).

342/3. POPULUS TREMULA L. (MPW). Rare, and probably diminishing.

343/9. SALIX VIMINALIS L. (!). A few lines of planted bushes; not naturalized.

343/12b. S. ATROCINEREA Brot. (*S. cinerea* L.). (MPW).

343/9 × 12. S. × SMITHIANA Willd. (MPW). Nearly gone; in 1967 only one small bush was seen; it was almost buried in the reedswamp by Church Lough.

343/16. S. REPENS L. (!).

* 346/1. CALLUNA VULGARIS (L.) Hull. (!). Very stunted, but dominant over most of the isands.

* 357/1. ERICA TETRALIX L. (!).

* 357/4. E. CINEREA L. (!).

358/2. VACCINIUM MYRTILLUS L. (MPW). Only on one line of rocky bluffs.

* 364/1. EMPETRUM NIGRUM L. (MPH). In several places on Shark; not refound on Bofin and certainly rare, but perhaps overlooked.

* 366/1. ARMERIA MARITIMA (Mill.) Willd. (!).

* 367/5. PRIMULA VULGARIS Huds. (!).

370/1. LYSIMACHIA NEMORUM L. (PW).

* 372/1. ANAGALLIS TENELLA (L.) L. (!). Very abundant in a wide range of communities.

* 372/2. A. ARVENSIS L. (!).

* 372/4. A. MINIMA (L.) E. H. L. Krause. (!). Frequent in suitable places.

* 373/1. GLAUX MARITIMA L. (!).

* 374/1. SAMOLUS VALERANDI L. (!).

* 382/4. CENTAURIUM ERYTHRAEA Rafn. (!).

* 385/1. GENTIANELLA CAMPESTRIS (L.) Börner. (!). Noted as frequent by M, but only one small colony was seen on each island.

386/1. Menyanthes trifoliata L. (!).

* 400/2. Myosotis secunda A. Murr. (PWH). Common on Bofin; rare on Shark.

* 400/4. M. caespitosa K. F. Schultz. (!). Widespread, but rarer than the preceding.

400/8. M. arvensis (L.) Hill. (MPW).

405/1. Convolvulus arvensis L. (PW).

406/1–3. Calystegia sepium L. *s.l.* (!). M noted that the flowers were pink; W confirmed this in 1967 and noticed also that they are larger than in typical *C. sepium*, and that the plant has inflated, overlapping bracteoles, a hairy leaf-sinus, and other features associated with subsp. *pulchra* (Brummitt & Heywood) Tutin. Dr Brummitt has determined very similar plants from elsewhere in Western Ireland as *C. sepium* subsp. *roseata* Brummitt, but we are reluctant to accept a taxonomy which places them closer to typical *C. sepium* than to the pink garden escape. We prefer, therefore, to adopt the taxonomy of Tutin in Clapham, Tutin & Warburg (1962); under this the Inishbofin plant must be named subsp. *pulchra*, though with slight tendencies to diverge in the direction of subsp. *sepium*. It is almost certainly native, as although it grows in the hotel garden it is most abundant in marshes and reedswamps far from houses.

424/2. Scrophularia auriculata L. (*S. aquatica* auct.) !). Appears to be increasing.

430/1. Veronica beccabunga L. (!).

430/4. V. scutellata L. (PW).

430/7. V. chamaedrys L. (!).

* 430/13. V. serpyllifolia L. (PWH). Rather rare.

430/15. V. arvensis L. (!). Rather rare.

430/21. V. persica Poir. (PWH). Now common on Bofin, but not seen on Shark.

430/22. V. polita Fr. (MPW). Very rare; only one plant seen by W in a was in 1967. Here, as almost everywhere in Ireland, ousted by *V. persica* over the last 60 years.

430/23. V. agrestis L. (MPW). Fairly plentiful (1967) in the hotel garden on Bofin, and in a field at Cloonamore. Occurs as a robust, pink-flowered form.

* 432/1. Pedicularis palustris L. (!).

* 432/2. P. sylvatica L. (!). Widespread, but less abundant, at least on Bofin, than might have been expected. All plants examined were subsp. *hibernica* D. A. Webb, with hairy calyx.

* 433/2. Rhinanthus minor L. (!). All plants examined were referable to subsp. *stenophyllus* (Schur.) O. Schwarz.

* 435/1(12). Euphrasia tetraquetra (Brébisson) Arrondeau (*E. occidentalis* Wettst.). (MWH). Occurs in a very dwarf form on exposed cliff-tops at the western end of both islands; the dwarf habit is retained in cultivation (P. F. Yeo). This species was seen by M, to judge from his description, though he does not give it a name.

* 436/1. Odontites verna (Bellardi) Dumort. (!). As noted by M, the plants are referable to subsp. *serotina* Corbière.

437/1. Parentucellia viscosa (L.) Caruel. (PWH). Seen not only in P's station, but also in a marsh near the harbour. Probably spreading slowly, as in other places in W. Ireland.

* 441/1. Pinguicula lusitanica L. (!). Rather rare.

* 441/3. P. vulgaris L. (!).

442/4. Utricularia minor L. (MPW). Rare; seen not in M's station, but in the bog at the head of Bennamullen Bay, and also N.E. of Bofin Lough (Miss Scannell).

* 445/4. Mentha aquatica L. (!).

* 448/3. Thymus drucei Ronn. (!). Abundant.

* 457/1. Prunella vulgaris L. (!). White-flowered plants are frequent, especially on Shark.

* 459/6. Stachys palustris L. (!).

459/7. S. sylvatica L. (PW). Rare.

462/3. Lamium hybridum Vill. (PW). Now frequent. This species seems to have expanded at the expense of *L. moluccellifolium* in many parts of Ireland over the past 60 years.

* 462/4. L. purpureum L. (!). Frequent on Bofin; only one plant seen on Shark.

469/2. Scutellaria minor Huds. (MPW). Rare.

470/4. Teucrium scorodonia L. (!).

* 472/1. Plantago major L. (!).

* 472/3. P. lanceolata L. (!).

* 472/4. P. maritima L. (!). Abundant and dominant in *Plantago*-sward over considerable areas at the W. end of both islands.

* 472/5. P. coronopus L. (!).

* 473/1. Littorella uniflora (L.) Aschers. (!). Not only in the lakes on Bofin, but in small and shallow pools on cliff-tops near the west end, where submergence must be very intermittent. One small patch in a slow stream on Shark.

475/7. Campanula rotundifolia L. (!).

* 479/1. Jasione montana L. (!). Abundant, giving with *Thymus drucei* an unusual and brilliant colour-effect. Pink- and white-flowered plants were seen on Shark.

480/2. Lobelia dortmanna L. (!).

485/4. Galium verum L. (!).

485/5. G. saxatile L. (MPW).

* 485/8. G. palustre L. (!).

* 485/12. G. aparine L. (!). Only one plant seen on Shark (on a wall).

487/2. Sambucus nigra L. (MPW). In several places on Bofin, by ruined cottages or on banks, but always planted, and severely wind-shorn and stunted.

* 491/3. Lonicera periclymenum L. (!).

* 500/1. Succisa pratensis Moench. (!).

502/2. Bidens tripartita L. (PW). Rare.

* 506/1. Senecio jacobaea L. (!).

* 506/2. S. aquaticus Hill. (!).

* 506/8. S. vulgaris L. (!).

* 508/1. Tussilago farfara L. (!).

512/1. Inula helenium L. (PW). Still in the station noted by P; protected from the west wind by a wall, and easily overlooked.

513/1. Pulicaria dysenterica (L.) Bernh. (MPW).

* 515/4. Gnaphalium uliginosum L. (!).

517/1. ANTENNARIA DIOICA (L.) Gaertn. (PW). Rather rare, but seen on heaths in the centre of Bofin as well as on sand-dunes.

518/1. SOLIDAGO VIRGAUREA L. (!).

* 519/1. ASTER TRIPOLIUM L. (!). Frequent on cliff-ledges in Shark and on the S.E. coast of Bofin.

* 524/1. BELLIS PERENNIS L. (!).

* 528/1. ACHILLEA MILLEFOLIUM L. (!).

* 528/3. A. PTARMICA L. (!).

* 531/1. TRIPLEUROSPERMUM MARITIMUM (L.) Koch. (!). Mainly on cliff-ledges. Only subsp. *maritimum* was seen.

* 532/2. MATRICARIA MATRICARIOIDES (Less.) Porter. (PWH).

533/1. CHRYSANTHEMUM SEGETUM L. (MW). On the rotting thatch of a ruined cottage above the W. end of Bofin harbour (1967). Not seen by Praeger; apparently on the verge of extinction.

* 533/2. C. LEUCANTHEMUM L. (!).

* 538/4. ARCTIUM MINUS Bernh. *s. l.* (!). Flowering plants were not seen. Praeger named his plant *A. newbouldii* A. Benn., but it is not clear what exactly he meant by this name.

* 540/2. CIRSIUM VULGARE (Savi) Ten. (!).

540/3. C. PALUSTRE (L.) Scop. (MPW). Remarkably rare; only 3 or 4 plants were seen, in a field E. of Bofin harbour. This species, however, though frequent in Connemara as a whole, becomes scarcer near the W. coast.

* 540/4. C. ARVENSE (L.) Scop. (!). Noted by M as rare; now locally abundant.

* 540/8. C. DISSECTUM (L.) Hill. (PWH).

544/1. CENTAUREA SCABIOSA L. (!). Rare.

* 544/6. C. NIGRA L. (!).

547/1. LAPSANA COMMUNIS L. (MPW). Rare; seen only as a weed in the hotel garden.

* 549/1. HYPOCHOERIS RADICATA L. (!).

* 550/1. LEONTODON AUTUMNALIS L. (!).

* 550/3. L. TARAXACOIDES (Vill.) Mérat. (!).

* 556/3. SONCHUS OLERACEUS L. (!).

556/4. S. ASPER (L.) Hill. (!).

* 588/2(1). PILOSELLA OFFICINARUM C. H. & F. W. Schultz subsp. OFFICINARUM (*Hieracium pilosella* L.). (!).

559/6. CREPIS CAPILLARIS (L.) Wallr. (PW). 'Chiefly in sandy ground', according to P; it is now more frequent on sodded walls and banks.

* 560/1. TARAXACUM OFFICINALE Weber. (!).

* 574/1. TRIGLOCHIN PALUSTRIS L. (!).

574/2. T. MARITIMA L. (PW). Rather rare.

[* 576/1. ZOSTERA MARINA L. (MPH). Recorded by M for Bofin harbour and, by implication, confirmed by P. Not to be seen there now, and there is no sign of it in jetsam. Leaves were, however, seen by H washed up on Shark and Gort. Their provenance is unknown, but it seems more likely that they came from the archipelago than from the mainland.]

577/1. POTAMOGETON NATANS L. (MPW).

577/2. P. POLYGONIFOLIUS Pourr. (!).

577/21. P. PECTINATUS L. (!). Abundant in Lough Bofin.

579/2. RUPPIA MARITIMA L. (PWH). Abundant in Lough Bofin.

582/1. ERIOCAULON AQUATICUM (Hill) Druce (*E. septangulare* With). (MPW).

* 584/1. NARTHECIUM OSSIFRAGUM (L.) Huds. (!).

* 605/1. JUNCUS SQUARROSUS L. (!). Rather rare on both islands, which is surprising in view of the terrain.

* 605/5. J. GERARDII Lois. (!).

* 605/7. J. BUFONIUS L. (!).

* 605/9. J. EFFUSUS L. (!).

* 605/10. J. SUBULIFLORUS Drej. (*J. conglomeratus* auct.). (!).

605/14. J. MARITIMUS Lam. (PWH). Confined to one small patch on the S. Side of Bofin harbour.

* 605/18. J. ACUTIFLORUS Ehrh. ex Hoffm. (!).

* 605/19. J. ARTICULATUS L. (!).

* 605/22. J. BULBOSUS L. (!).

606/3. LUZULA SYLVATICA (Huds.) Gaudin. (!). Rare.

* 606/8. L. CAMPESTRIS (L.) DC. (!).

* 606/9. L. MULTIFLORA (Retz.) Lejeune. (!).

607/2. ALLIUM BABINGTONII Borrer. (MPW). A few plants on a field-margin near the north side of Bofin harbour; not now accompanying the *Inula helenium*, as was noted by P.

616/4. IRIS PSEUDACORUS L. (!).

640/1. OPHRYS APIFERA Huds. (PW). One plant seen in 1965 W. of Cloonamore Bay.

* 643/2. DACTYLORHIZA MACULATA (L.) Soo (*Dactylorchis maculata* (L.) Vermeul.). (!). Commoner than is implied by M and P.

* 643/6. D. MAJALIS (Reichb.) P. F. Hunt & Summerh. *s. l.* (PWH). P's record of *D. incarnata* is interpreted as referring to this species. It is widespread on Shark, and very abundant in marshy meadows in the centre of Bofin. The plants come nearest to *D. kerryensis* (*Dactylorchis majalis* subsp. *occidentalis*) but, as so often in Co. Galway, are in variable degree transitional to *D. purpurella*. The flowers are mostly deep purple, but one population was seen in which they were pale pink.

650/3. LEMNA MINOR L. (!).

652/1. SPARGANIUM ERECTUM L. (PW).

652/3. S. ANGUSTIFOLIUM Michx. (!). Unusually plentiful.

* 654/1. ERIOPHORUM ANGUSTIFOLIUM Honck. (!).

* 654/4. E. VAGINATUM L. (PH). Searched for by W in Praeger's station, but not found. Seen by H in a few places on the S. side of Shark.

655/3. SCIRPUS MARITIMUS L. (PWH).

655/8. S. LACUSTRIS L. (PW).

* 655/11. S. CERNUUS Vahl. (!).

* 655/12. S. FLUITANS L. (!).

* 656/4. ELEOCHARIS MULTICAULIS (Sm.) Sm. (!). Very abundant.

* 656/5. E. PALUSTRIS (L.) Roem. & Schult. (!).

* 659/1. SCHOENUS NIGRICANS L. (!). Local; not widespread on bogs as in most of Connemara.

663/2. CAREX DISTANS L. (MPW).

* 663/5. C. BINERVIS Sm. (!). Abundant.

* 663/8. C. DEMISSA Hornem. (!). Abundant; M's *C. flava* var. *lepidocarpa*, is presumably to be interpreted as this; *C. lepidocarpa s. s.* does not occur. Plants on wet, stony ground near the sea on Bofin and Shark come close to *C. serotina* in a number of characters, but A. O. Chater and A. C. Jermy agree that they are best referred to *C. demissa*.

* 663/11. C. EXTENSA Gooden. (!).

663/16. C. ROSTRATA Stokes. (MPW).

* 663/26. C. PANICEA L. (!).

663/28. C. LIMOSA L. (PW). Rare.

* 663/31. C. FLACCA Schreb. (!).

663/36. C. CARYOPHYLLEA Latourr. (MPW).

* 663/50. C. NIGRA (L.) Reichard. (!).

* 663/57. C. OTRUBAE Podp. (!).

663/61. C. ARENARIA L. (MPW).

* 663/70. C. ECHINATA Murr. (!).

* 663/74. C. OVALIS Gooden. (!).

* 663/80. C. PULICARIS L. (!).

663/81. C. DIOICA L. (PW). Rare.

* 665/1. PHRAGMITES AUSTRALIS (Cav.) Steud. (*P. communis* Trin.). (!). On sea-cliffs and bogs, as well as in lakes.

* 667/1. MOLINIA CAERULEA (L.) Moench. (!).

* 668/1. SIEGLINGIA DECUMBENS (L.) Bernh. (!).

* 669/1. GLYCERIA FLUITANS (L.) R. Br. (!).

669/2. G. PLICATA Fr. (MPW).

* 670/6. FESTUCA RUBRA L. (!). Abundant on sea-cliffs.

670/8. F. OVINA L. (MPW).

* 671/1. LOLIUM PERENNE L. (!).

* 672/2. VULPIA BROMOIDES (L.) Gray. (!).

* 673/1. PUCCINELLIA MARITIMA (Huds.) Parl. (!).

674/2. CATAPODIUM MARINUM (L.) C. E. Hubbard. (MPW).

* 676/1. POA ANNUA L. (!).

* 676/10. P. PRATENSIS L., *s. l.* (!).

* 676/13. P. TRIVIALIS L. (!).

* 678/1. DACTYLIS GLOMERATA L. (!). Only one plant was seen on Shark.

* 679/1. CYNOSURUS CRISTATUS L. (!).

* 683/10. BROMUS HORDEACEUS L. (*B. mollis* L.). (!).

684/1. BRACHYPODIUM SYLVATICUM (Huds.) Beauv. (MPW).

* 685/3. AGROPYRON REPENS (L.) Beauv. (MPH). Not seen on Bofin, but perhaps overlooked; in rough grassland at one place on Shark.

* 689/1. KOELERIA CRISTATA (L.) Pers. (!).

692/1. AVENA FATUA L. (MPH).

* 694/1. ARRHENATHERUM ELATIUS (L.) Beauv. ex J. & C. Presl. (!).

* 695/1. HOLCUS LANATUS L. (!).

696/3. DESCHAMPSIA FLEXUOSA (L.) Trin. (MPW). Rather rare, in spite of much suitable terrain, but this is also true over much of Connemara, and indeed Ireland.

* 697/1. AIRA PRAECOX L. (!).

* 697/2. A. CARYOPHYLLEA L. (!).

699/1. AMMOPHILA ARENARIA (L.) Link. (!). Mainly on rocky cliff-ledges on the S.W. shore of Bofin.

700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. (MPW). Observed by W in both stations recorded by P. The plant at Bofin harbour was exactly as he described it, with a single inflorescence. The plant at Cloonamore has, however, suffered invasion by *Arrhenatherum*; now 2 smallish plants may be seen, of which one bore a single inflorescence.

* 701/2. AGROSTIS CANINA L. (!).

* 701/3. A. TENUIS Sibth. (!).

* 701/5. A. STOLONIFERA L. (!).

* 712/1. ANTHOXANTHUM ODORATUM L. (!).

* 715/1. NARDUS STRICTA L. (!). Abundant.

(2). NEW RECORDS, 1965–7

1/1. HUPERZIA SELAGO (L.) Bernh. ex Schrank & Mart. (*Lycopodium selago* L.). (W). 1 or 2 stunted plants on heathland in the E. centre of Bofin were seen on each visit.

†4/10. EQUISETUM TELMATEIA Ehrh. (H). At the base of a cliff, E. of the school on Shark. An unexpected find, as this species is very rare in W. Galway; apart from two 19th-century records by Praeger it is known only from a well-wooded district near Moyard. It occurs, however, on Clare Island, Co. Mayo.

14/1. PHYLLITIS SCOLOPENDRIUM (L.) Newm. (W). Several plants in walls N.E. of Bofin harbour. Perhaps a recent immigrant.

21/2. DRYOPTERIS PSEUDO-MAS (Wollaston) Holub & Pouzar (*D.b orreri* Newm.). (W). One large plant in a deep ditch along the principal N.-S. road N.E. of Bofin harbour. *D. filix-mas* is plentiful.

66/8. FUMARIA OFFICINALIS L. (H). 2 small plants on shingle near the harbour.

* 102/2. NASTURTIUM MICROPHYLLUM (Boenn.) Reichb. (*Rorippa microphylla* (Boenn.) Hyland). (H). Fairly common on Shark. Noted by H for Bofin, but not seen by W.

102/1 × 2. N. MICROPHYLLUM × OFFICINALE (*Rorippa* × *sterilis* Airy-Shaw) (W). In small quantity, with *N. officinale*, E. of the ruined church on Bofin. Like *N. officinale*, here mostly very large.

* 141/1. POLYGALA VULGARIS L. (WH). On cliff-top on Shark, and on sand-dunes on Bofin; sparingly in both places.

†143/4. SPERGULARIA MEDIA (L.) C. Presl. (H). Under a wall on a cliff-top on Shark.

195/3. LOTUS ULIGINOSUS Schkuhr. (WH). In a damp meadow near Bofin harbour, and in a roadside ditch near Lough Bofin.

221/2. APHANES MICROCARPA (Boiss. & Reut.) Rothm. (W). Roadside on Bofin in 3 places.

257/1. Fuchsia magellanica Lam. (WH). Nowhere naturalized, but now much the commonest hedge-plant on Bofin, and sometimes far from houses; it has apparently replaced some of the shrubs listed by Praeger. It may be a recent introduction, but it seems more likely that Praeger (and perhaps More) ignored it as not being a 'respectable' alien.

310/1. Pastinaca sativa L. (W). A few plants on a field-margin E. of the ruined church on Bofin.

* 320/1(4). Polygonum arenastrum Bor. (*P. aequale* Lindm.). (WH). Near the harbour on Bofin, and abundant on a link-road leading north above the harbour. The plants collected by W have fruits 2·8-3 mm long, but in other respects seem typical.

336/1. Alnus glutinosa (L.) Gaertn. (W). One hedge, and an isolated bush near by, near the centre of Bofin; obviously planted, but thriving better than most of the shrubs.

343/4. Salix fragilis L. (W). Three small bushes by the stream flowing out of Church Lough on Bofin; probably planted, but perhaps naturalized from a now defunct hedge.

378/2. Ligustrum ovalifolium Hassk. (W). In a field-hedge in one place near the centre of Bofin; taller than any other shrub seen in an equally exposed position.

400/9. Myosotis discolor Pers. (W). Locally abundant on Bofin in wet meadows and marshes; up to 65 cm high. Apparently a distinct ecotype, known also from Connemara and W. Scotland.

430/3. Veronica catenata Pennell. (W). Frequent by the stream running out of Church Lough.

* 435/1 (2). Euphrasia scottica Wettst. (W). Abundant and widespread on heathy ground, where perhaps *E. micrantha* would rather have been expected. (Det. P. F. Yeo.)

†435/1 (4). E. frigida Pugsl. (H). Only on Shark; unusual at such a low elevation. (Det. E. F. Warburg.)

435/1 (15). E. confusa Pugsl. (W). Fairly frequent on heathy ground on Bofin; not altogether typical, and perhaps hybridizing with *E. brevipila*.

* 435/1 (18). E. brevipila Burnat & Gremli. (WH). Frequent in meadows, on roadsides, etc.

481/1. Sherardia arvensis L. (W). On the ruined church, and on banks N.E. of the harbour.

560/4. Taraxacum laevigatum (Willd.) DC. (W). On sandy ground on Bofin in two places.

600/1. Endymion non-scriptus (L.) Garcke. (W). Fairly plentiful on the rocky scarp S. of Church Lough, Bofin. W's visit in 1965 was the only one early enough to see this species.

605/18 × 19. J. acutiflorus × articulatus. (W). A few large stands of this were seen in a marshy field N.W. of Church Lough; it was too early to verify with confidence the sterility of the capsules, but the plants stood out from the parents by their clonal growth.

* 620/1. Crocosmia × crocosmiflora (Lemoine) N.E. Br. (WH). Widespread on Bofin, often far from houses; it has clearly increased greatly since 1911. Only a few clumps on Shark, and perhaps surviving rather than truly naturalized.

* 655/10. Scirpus setaceus L. (WH). A few plants near Lough Gowlanagower on Bofin; also in boggy places on Shark.

656/6. ELEOCHARIS UNIGLUMIS (Link) Schult. (W). In two places S. of Bofin harbour, and also by Lough Bofin.

* 663/34. CAREX PILULIFERA L. (WH). Dry heaths on both islands, rather sparingly.

* 670/10. FESTUCA VIVIPARA (L.) Sm. (WH). Common on exposed heaths on both islands. It is curious that neither M nor P should have mentioned this plant, even though it was not generally given specific status in their day.

* 683/12. BROMUS HORDEACEUS L. subsp. THOMINII (Hardouin) Hyland. (*B. thominii* Hardouin). (WH). Sparingly on both islands, growing with *B. hordeaceus* subsp. *hordeacus*.

683/13. B. LEPIDUS Holmberg. (W). At the edge of a meadow near Bofin harbour.

691/1. TRISETUM FLAVESCENS (L.) Beauv. (WH). E. of Bofin harbour. A rather unexpected find, as this species is seldom seen off the limestone. There is, however, one record for the mainland not far away.

* 708/3. ALOPECURUS GENICULATUS L. (WH). Rather frequent on both islands, not only in marshes and ditches but even (on Bofin) on a sodded wall.

Though it scarcely deserves a place in the list, it is of interest to note that *Zantedeschia aethiopica* (arum lily) still survives on Shark.

(3). OLD RECORDS NOT CONFIRMED

1/2. LYCOPODIELLA INUNDATA (L.) Holub (*Lycopodium inundatum* L.). (P). Possibly extinct; there has been a lot of peat-cutting near the station indicated by Praeger. Praeger's precise station was not, however, located with confidence.

16/1. CETERACH OFFICINARUM DC. (P). Searched for by W on both visits in the limited station indicated. Probably a casual.

66/2. FUMARIA CAPREOLATA L. (MP). Much rarer everywhere in Ireland than it was 60 years ago; probably extinct.

74/2. RAPHANUS MARITIMUS Sm. (MP). Like many biennials, this varies greatly in abundance from year to year, but the fact that such a conspicuous plant was not seen by W on either visit suggests that it may be extinct.

108/1. SISYMBRIUM OFFICINALE (L.) Scop. (MP).

133/7. STELLARIA GRAMINEA L. (P). Searched for by W on both visits; if it survives it must be in very small quantity.

136/10. SAGINA NODOSA (L.) Fenzl. (MP). Easily overlooked in June or July.

143/5. SPERGULARIA MARINA (L.) Griseb. (MP). Evidently rare, but not searched for systematically.

163/2. MALVA SYLVESTRIS L. (MP). Apparently extinct.

163/4. M. NEGLECTA Wallr. (P). Apparently extinct.

164/1. LAVATERA ARBOREA L. (P). A few plants were seen beside houses on Bofin, and in one place there were 2 seedlings on the road, but their chances of coming to maturity seemed slight. The present status of this species does not entitle it to a place in the flora.

192/4. TRIFOLIUM MEDIUM L. (P). Probably a short-lived relic of cultivation.

211. RUBUS spp.: We find it impossible to be certain what plants were intended by More's and Praeger's records; subsequent authorities do not agree on synonymy. The names used were *R. carpinifolius*, *dumnoniensis*, *mollissimus*, *dunensis*, *thyrsoideus* and *discolor*. The last-named indicates *R. ulmifolius* Schott; the application of all the others seems open to some ambiguity or uncertainty.

212/15. POTENTILLA REPTANS L. (M). Perhaps a robust form of *P. anglica.* Specimens collected by More of *P. erecta* and *P. anglica* are in **TCD** herbarium, but there is no specimen of *P. reptans.*

215/1. FRAGARIA VESCA L. (P). Searched for by W on both visits.

232/1. SORBUS AUCUPARIA L. (P). Searched for carefully; apparently extinct.

247/2. DROSERA ANGLICA Huds. (P). For comment, see under *Lycopodiella inundata.*

301/1. AETHUSA CYNAPIUM L. (P).

343/1. SALIX PENTANDRA L. (P). Apparently replaced by *Fuchsia* or other shrubs

392/1. SYMPHYTUM OFFICINALE L. (P.) Apparently extinct.

430/2. VERONICA ANAGALLIS-AQUATICA L. (MP). The records refer to *V. catenata*.

442/3. UTRICULARIA INTERMEDIA Hayne. (P). Not searched for sufficiently thoroughly to pronounce on its present status.

448/1. THYMUS PULEGIOIDES L. (P, as *T. chamaedrys* Fr.). An error; the characters of the species were imperfectly understood in Praeger's day.

459/3. STACHYS ARVENSIS (L.) L. (MP). Perhaps extinct.

462/2. LAMIUM MOLUCCELLIFOLIUM Fr. (P). Probably extinct; much rarer everywhere than in Praeger's day.

465/4. GALEOPSIS TETRAHIT L. (MP). Probably extinct.

506/6. SENECIO SYLVATICUS L. (M). Apparently extinct.

533/5. CHRYSANTHEMUM VULGARE (L.) Bernh. (P). This can hardly have been overlooked; almost certainly extinct.

535/1. ARTEMISIA VULGARIS L. (MP). Apparently extinct.

556/2. SONCHUS ARVENSIS L. (MP). Noted by M as 'a colonist among the crops'. In Connemara it is seldom seen now as a cornfield weed; it is more usual in walls and hedges. It seems to have failed to make this adjustment in Bofin.

577/15. POTAMOGETON BERCHTOLDII Fieb. Recorded by M from Church Lough and by P for another station (as *P. pusillus*, but this species is probably intended). Unfortunately these records were overlooked, and the plant was not searched for.

635/1. COELOGLOSSUM VIRIDE (L.) Hartm. (P).

638/1. PLATANTHERA CHLORANTHA (Custer) Reichb. (P).

656/3. ELEOCHARIS QUINQUEFLORA (F. X. Hartmann) Schwarz. (MP). Doubtless still there; easily overlooked.

660/1. RHYNCHOSPORA ALBA (L.) Vahl. (P). Searched for carefully in 1967, at a time when it was in flower. Probably extinct from drainage or cutting.

670/1. FESTUCA PRATENSIS Huds. (M). See next species.

670/2. F. ARUNDINACEA Schreb. (M). This and the preceding seem to have been short-lived introductions for meadows. The islands do not provide the sort of terrain in which one would expect either to become naturalized.

670/11. F. LONGIFOLIA Thuill. (M, as *F. duriuscula*). Probably an error.

671/3. LOLIUM TEMULENTUM L. (M). Perhaps only a casual, even in More's day; now virtually extinct in Ireland.

677/1. CATABROSA AQUATICA (L.) Beauv. (P). Searched for in the limited station indicated; nothing but *Glyceria fluitans* was seen. The grazing is, however, heavy here, and it is possible that a few non-flowering plants were overlooked.

COMMENT ON THE LISTS

In spite of the considerable number of new records, and of old records not confirmed, the main impression given by the lists is the stability of the flora. A few species have probably appeared, and a few have disappeared; some have become commoner and others rarer, but the great majority show no obvious change over nearly a century, and the persistence both of natives like *Calamagrostis epigejos* and of aliens like *Inula helenium* is impressive.

The list of new records comprises 14 segregates not recognized by earlier authors and 22 which they would have listed if they had seen them. Of the 22 4 are planted shrubs, of which only one can claim to be naturalized, and one is a garden escape (*Crocosmia*); these are clearly new elements brought in by man. The remaining 17 species are rather difficult to assign to their two possible categories—plants overlooked by Praeger, or immigrants since his day by natural means or by unintentional human agency. *Endymion* and *Carex pilulifera* probably belong to the first category; *Bromus lepidus* and *Fumaria officinalis* more probably to the second. The most baffling case is that of *Alopecurus geniculatus*. This is now rather common on Bofin, and it seems very difficult to believe that it was overlooked by Praeger; yet it is an unlikely plant to have spread widely from a chance introduction. Making the best guess we can, we estimate that about 12 species have arrived in the islands and established themselves there since 1911.

Turning now to the losses, we find that of the 40 species previously recorded which we failed to find, 5 were probably recorded in error. Of the remaining 35 species over half are weeds, ruderals or cultivated plants, and it seems probable that the great majority of these are truly extinct, though the case of *Chrysanthemum segetum* is a warning against dogmatizing on such a matter. Of the 17 species which grow in natural habitats two or three may have been eliminated by turf-cutting and one or two by wind, but the majority are probably still there.

If it be asked why the decline in the number of the weeds and ruderals has been so pronounced, it is clear that decline in the population and change of farming habits give part of the answer. The population of the islands at the time of More's visit was about 1,300; at the 1961 census it was 268. The area under tillage must have declined *pro rata*, and this is confirmed by the figures for the decline in western Ireland generally. Furthermore, there is less genuine subsistence farming, and the variety of crops is therefore less. Differential weedkillers have not yet made their influence felt here, but imported seed of all kinds is, of course, much cleaner than in 1911. Furthermore, it would seem that successful, recently established aliens such as *Veronica persica* and *Matricaria matricarioides* have achieved their success at the expense of older-established species. The decline in ruderals is not so easy to explain as that of weeds, but it seems to be a general phenomenon in Ireland. One has only to look at maps in the *Atlas of the British Flora* (Perring and Walters, 1962) of such species as *Chenopodium rubrum*, *Artemisia absinthium* or *Cichorium intybus*, where pre-1930 records are differentiated from recent ones, to realize this; and although the ecologically-minded botanist of today may spend less of his time poking around rubbish-heaps than did his predecessors, this is not in itself a sufficient explanation. In some places the tarring of roads and the replacement of horses by cars has helped to change the roadside flora, but on Inishbofin asphalt is unknown and motor-vehicles number two. One is forced to the conclusion that although the Irish village is not a model of tidiness now, it must have been messier around 1900.

The results of the depopulation of Inishshark are not yet very obvious in its flora, but it is clear that a considerable number of annuals, of which only a single plant was seen in 1965, are heading towards extinction, and the number of plants introduced during the period of human habitation which have permanently established themselves is fairly small.

EXPECTED SPECIES NEVER RECORDED

We may appropriately conclude with a list of species which one might reasonably expect to find on these islands, but which have never been recorded there. The criterion for inclusion in this list is that the species should be widespread in Connemara, should grow in a type of habitat which is represented on these islands, and be tolerant of extreme exposure. This last consideration excludes most woody plants (even *Crataegus monogyna*!) and those dependent on shade or shelter.

Isoetes lacustris
Asplenium trichomanes
Nymphaea alba
Ulex gallii
Umbilicus rupestris
Drosera intermedia
Daboecia cantabrica
Scrophularia nodosa
Digitalis purpurea
Veronica officinalis
Valeriana officinalis
Baldellia ranunculoides
Scirpus caespitosus
Cladium mariscus
Carex hostiana
C. lasiocarpa.

The islands most closely comparable with Inishbofin and Inishshark are Inishturk and Clare Island (Co. Mayo). Only 5 of the species listed above (*Asplenium trichomanes, Ulex gallii, Daboecia cantabrica, Cladium mariscus* and *Carex lasiocarpa*) are absent from both Inishturk and Clare Island (Praeger, 1907, 1911*a*). It looks, therefore, at first sight, as though the remaining 11 have been excluded from the flora of Inishbofin mainly by chance. But it is significant that with one exception (*Digitalis*, which is frequent on Clare Island, though it does not occur on Inishturk) all of them occur very sparingly on Inishturk or Clare Island (in 3 cases on both). It would seem, therefore, that some ecological factor, too subtle for our apprehension at present, is working against their presence on all these islands.

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PLANT RECORDS FROM MULL AND THE ADJACENT SMALL ISLANDS

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The Department of Botany, British Museum (Natural History), is engaged in a detailed survey of the vegetation of the island of Mull with its adjacent small islands, e.g. Iona, Ulva, Erraid and the Treshnish Isles (V.C. 103 Mid Ebudes in part). Two years' work has already been completed in the study of the plants in the field and the collation of older records from published sources and herbarium specimens. It is anticipated that after another three years' work a publication of the 'County Flora' type will be produced. An aim of the survey is to account for all the major groups of plants on an equal basis, giving the same prominence to microscopic vegetation such as the freshwater algae, as to the more familiar flowering plants and ferns. An assessment of the geographical and ecological relationships of the flora will be included.

In addition to the large number of our own departmental staff, several botanists, both professional and amateur, have generously co-operated in the progress of this work. This paper, which is concerned solely with the vascular plants, owes much to the contributions of our collaborators, especially Miss U. K. Duncan, A. G. Kenneth and A. McG. Stirling, from whom we have been very grateful to receive voucher specimens for many of their interesting records.

Mull was chosen as the subject for our studies partly because it is an under-worked area, but also as an area in which we could fulfil in some measure the Department's special responsibilities in the study and exploration of the British flora. In spite of the sparseness of published information, we have been surprised to discover the relatively large number of botanists who have collected or recorded on Mull, amounting to no less than seventy, excluding our own survey members. For this reason, we take the opportunity of prefacing these first contributions from our survey with a brief historical account of the exploration of the flora of Mull.

The earliest definite records that we have been able to trace date back to 1772 when John Lightfoot visited the islands in company with Thomas Pennant, the distinguished zoologist. An account of their visit will be found, with a few records, in Pennant's *Tour in Scotland* (1774) and from this we learn that their attentions were mainly devoted to Iona. Several further records resulting from this visit appeared later in Lightfoot's *Flora Scotica* (1777). Lightfoot refers to a record in Ray's *Synopsis* ed. 3, p. 458 (1724) of *Arctous alpinus* mentioned in a letter from Edward Lhwyd to Richard Richardson. The locality was said to be 'for some miles together in that . . . end of Mull, next to Eycolumb-Kill' [Iona]. Lightfoot is of the opinion, based on his own observations, that the plant was *Arctostaphylos uva-ursi* with which opinion we agree, whilst accepting this as the probable first record for the flora of Mull.

In 1877 George Ross published a paper on the 'Isle of Mull, Mid Ebudes' as No. 5 in the series of County Catalogues of Plants which appeared around this time in the *Reports of the Botanical Locality Record Club*. This list provided an extensive enumeration of the island's flora, but like the others in the series did not give specific localities. A year later, however, he published in the *Transactions and Proceedings of the Botanical Society of Edinburgh* a similar list, but with the addition of localities for the less common species. A number of localised specimens collected by G. Ross from the area between 1876 and 1878 are in the British Museum Herbarium. A few further records for Mull were published by Peter Ewing in short papers in 1890 and 1892, while his *Glasgow Catalogue* (ed. 1, 1892; ed. 2, 1899)—a 'Comital Flora' of the west of Scotland—gives some additional records which may refer to Mull, but are only localised to the vice county level.

The Botanical Exchange Club organised an excursion to Mull in 1939. The advent of the war shortly after prevented the normal publication of an account of this meeting. However, A. J. Wilmott, although he was not present himself on this occasion, salvaged as much information as was possible under war-time conditions and furnished a very creditable account of the itineraries and the more notable discoveries which was finally included in the *Botanical Society and Exchange Club Report* for 1939/40 (1942). Although his list reflects his own critical interest in the distribution of the British flora, he himself admits that he was severly handicapped by the lack of voucher specimens, the whereabouts of which he was unable to trace. As a result, several of his new records are tentative, although some of these have been subsequently confirmed by later work in the field. A member of the party, A. Templeman, published in the same *Report* a note on a visit to Iona and Lunga which he made after the main party had left. In the post-war period a number of short papers and notes have appeared. Miss M. B. Gerrans (1960) published a list of plants she collected in 1958 and presented to the British Museum. There have also been parties sponsored by the B.S.B.I. and the Committee for the Study of the Scottish Flora in 1961 and 1965, both of which have produced valuable information.

Field recording cards used by contributors to the B.S.B.I. Distribution Maps Scheme in our area, have been made available to us through the courtesy of Dr F. H. Perring of the Biological Records Centre.

Up to the end of 1967 five parties, amounting in total to some thirty man-weeks in the field, from this Department have visited the islands. As a result of these visits a considerable amount of data has been accumulated, from which we have selected some of the more interesting records for publication as an interim report, which is enriched by numerous records contributed by our collaborators.

In this paper the major critical groups have been excluded, but it is hoped that these will form the basis of a later paper.

SYSTEMATIC LIST

In the following list the British Museum (Natural History) Department of Botany Mull Survey, is referred to as BMMS. Specimens in the British Museum Herbarium are indicated by (BM) or by BMMS and number.

Localities unless otherwise stated are on the mainland of Mull. Further details (e.g. Nat. Grid. ref.) are available in most instances in our files.

The following members of the B.M. Survey are referred to in the list by surname only: Lorna F. Bowden, J. F. M. Cannon, A. Eddy, E. W. Groves, P. W. James, A. C. Jermy, A. Melderis, Elizabeth G. Moyes, R. Ross and Patricia A. Sims.

1/4. LYCOPODIUM CLAUATUM L. Three records were published by G. Ross in his 1878 list; these were not included in the *Atlas* map (Perring & Walters, 1962) owing to difficulties in precise localisation. We can now provide three definite localities: S'Airde Beinn, 1965, KENNETH; North Corrie of Ben More, 1966, DUNCAN; Loch a'Ghael, 1967, BMMS 621 (R. Ross & SIMS).

1/5. DIAPHASIUM ALPINUM (L.) Roth *Lycopodium alpinum* L. Omitted for V.C.103 in the *Atlas* as without firm record and noted by Ratcliffe (1963) in his short account of the 1961 B.S.B.I. Field Meeting. There appears to be some ambiguity about his record, as it was not published in "Plant Records", whereas *Lycopodium annotinum* was recorded with apparently identical data from the same field meeting. We have the following firm records: S.E. side of Ben More, 1966, DUNCAN; S.W. side of Maol nan Sgreuch, 1966, DUNCAN; Ben More summit, 1967, BMMS 1047 (EDDY).

21/3 × 8. DRYOPTERIS ABBREVIATA (DC.) Newm. × AEMULA (Ait.) Kuntze. An Coire, a wooded hill near Loch Buie, on glacial till with a thin cover of mossy peat, 1967, BMMS (EDDY & JERMY 6374). This hybrid, which was here discovered for the first time, is between species of two sections of the genus until now regarded as distantly related. *D. abbreviata* is not normally a woodland plant and these species rarely grow together; where they do, this hybrid should be searched for For further information see Jermy (1968).

25/1. POLYPODIUM VULGARE L. agg. Between Salen and the Forsa River, 1958, GERRANS 645 (BM), has been determined by A. C. Jermy as *P. vulgare* × *interjectum*. *P. interjectum* Shivas is known to us from seven localities. The distribution pattern appears to be coastal and in association with old woodlands, and the species has not yet been found at higher locations, as has *P. vulgare s.s.*

67/3. BRASSICA RAPA L. Accepted by the *Atlas* for V.C. 103 but not plotted. Salen, new housing estate, 1966, DUNCAN; Carsaig Bay, rubbish tip, 1967, BMMS 339 (BOWDEN).

122/1. ELATINE HEXANDRA (Lapierre) DC. Accepted by the *Atlas* for V.C. 103 but not plotted. Loch Bearnach, in 20-40 cm water on mud, 1967, BMMS 1034 (EDDY).

131/5. CERASTIUM ARCTICUM Lange. Ben More, N.E. Corrie, 1967, BMMS 337 (EDDY). Appears to be a new vice county record, representing an interesting extension of range to the islands, being paralleled only in the *Atlas* by a pre-1930 record from Skye.

137/1. MINUARTIA VERNA (L.) Hiern. Iona, coast rocks near Cnoc-nan-bradhan, Some doubt has been cast on this record and confirmation would be very welcome.

171/1. IMPATIENS NOLI-TANGERE L. Torloisk roadside, 1967, KENNETH. new vice county record, but no doubt an introduction.

192/17. TRIFOLIUM HYBRIDUM L. Ulva, in field near church on N.E. side, 1965, DUNCAN; new vice county record, but not seen by the recorder on a visit in 1966.

220/3(3). ALCHEMILLA FILICAULIS Buser subsp. FILICAULIS. Rocks, Allt na Teangaidh, 1965, KENNETH; Creach Beinn, Nat. grid. 17/6427, 1965, KENNETH. New vice county record.

221/1 & 2. APHANES ARVENSIS L. agg. A specimen corresponding to the first record for the area by G. Ross, 1876, has been determined by Dr. S. M. Walters as *A. microcarpa*. All other specimens and critically determined records that have come to our attention have also proved to be this species. Although *A. arvensis* agg. was not shown for Mull in the *Atlas*, it does not appear to be particularly uncommon in the area and we have over ten recent records.

235/12. SEDUM VILLOSUM L. Beinn na h'Iolaire, 1965, KENNETH; Creach Beinn, Nat. grid. 17/420290, 1967, BMMS 1005 (EDDY). First recorded by STIRLING in 1961 from Beinn na Sreine. These records show a substantial western extension of range.

238/1. UMBILICUS RUPESTRIS (Salisb.) Dandy. Well known on Iona but only previously known elsewhere in the area on the mainland of Mull near Tavool House. Now recorded from the small island of Erraid, 1967, BMMS (EDDY).

252/1. HIPPOPHAE RHAMNOIDES L. Recorded for V.C. 103 by Ewing in his *Glasgow Catalogue* ed. 2 (1899). We can now provide a precise locality: Torosay Castle, in fruit, abundant in small area at end of peninsula, 1967, BMMS 1011 (JAMES).

254/13. EPILOBIUM NERTERIOIDES Cunn. In addition to the well known locality in Aros House Woods shown in the *Atlas*, we can now add the following localities in S.E. Mull: Loch Buie, 1963, H. MILNE-REDHEAD; Creach Beinn, Nat. grid. 17/6427, 1965, KENNETH; Carsaig, to east of bay, 1966, BMMS (JAMES); Laggan Deer Forest, 1967, BMMS (EDDY).

[258/3. CIRCAEA ALPINA L. Originally recorded by G. Ross in his 1877 list and localised as Druimfin (near Tobermory). A specimen from Ton Dubh Sgairt collected by Templeman during the 1939 B.E.C. Excursion, has been redetermined by Prof. P. H. Raven as *C. intermedia*, which is widespread in Mull. In his paper Prof. Raven (1913) emphasises the frequency with which *C. intermedia* has been misidentified as *C. alpina*, which on present evidence we must conclude does not occur in our area.]

272/1. ERYNGIUM MARITIMUM L. First recorded by Pennant for Iona in 1772, who described it as frequent, and noted for Iona without comment by G. Ross in his 1878 list. Templeman states that he failed to find it in 1939, but it was indicated as 'rare' on a Distribution Maps Scheme card for Iona in 1955. It has not as yet been located during the B.M. Survey, although reasonably frequent in Coll and Tiree, where suitable habitats are much more widespread.

291/1. CARUM VERTICILLATUM (L.). Koch. Road to Loch Buie, 1963, ANNE BOWERMAN Corrynachenchy, Fishnish, 1967, KENNETH (BM). Apparently a new vice county record, and a logical extension to the islands from the adjacent mainland, where it is widely distributed.

294/1. PIMPINELLA SAXIFRAGA L. Rocks, west side of Ard Dubh, Ardalanish, 1967, KENNETH & STIRLING (BM). Here recorded for the first time from the mainland of Mull, having been previously only known from Iona.

320/2. POLYGONUM OXYSPERMUM C. A. Meyer & Bunge ex Ledeb. subsp. RAII (Bab.) D. A. Webb & A. O. Chater (*P. raii* Bab.). Only shown in the *Atlas* for Iona, but recorded from Calgary Bay by Wilmott (1942). The latter locality has been confirmed: 1966, DUNCAN, (BM), and we are able to add the following additional records: Uisken, 1966, BMMS (JERMY 6102) and 1967, KENNETH & STIRLING (BM); Cnoc an t- Suidhe, below Knockvologan, near Fionnphort, 1967, BMMS 450 (JERMY).

335/3. BETULA NANA L. A specimen in the Somerset County Museum (TTN) collected by H. H. SLATER is labelled 'Ben Mohr, Mull, 6, 1878'. Through the courtesy of Mr A. D. Hallam, we have been able to examine this specimen and to confirm its identification. The locality is clearly indicated, presumably in the collector's own hand, and must be accepted, assuming that no error has been involved in labelling; in this respect Mr Hallam writes 'I have no reason to believe that H. H. Slater was not an accurate observer'. Recent efforts to refind this station have failed and the possibility that the original specimen may have come from one of the other mountains named Ben More cannot be completely ruled out. We would welcome confirmation of this interesting potential extension of the range of this species westwards.

410/1. ATROPA BELLA-DONNA L. Recorded by Pennant for Iona in 1772 as 'the fatal belladonna is found here' but not reported since. It seems likely that at that time it may have been persisting as a remnant from cultivation in the garden of the then derelict monastery.

413/1. SOLANUM DULCAMARA L. Rocky shore west of Carsaig and the Nun's Pass, one plant in crevice of sandstone rock, 1967, KENNETH & STIRLING (BM). New vice county record.

420/3. LINARIA REPENS (L.) Mill. Salen, roadside near new housing estate, 1966, DUNCAN (BM). A new vice county record for this presumed introduction.

428/1. ERINUS ALPINUS L. On the wall round the derelict garden of Aros House, 1966, BMMS (CANNON and GROVES 6) and DUNCAN. Presumed to be persisting from earlier cultivation.

459/6 × 7. STACHYS PALUSTRIS × SYLVATICA (STACHYS × AMBIGUA Sm.). Salen, waste ground near road, 1966, DUNCAN (BM). The first vice county record for this not uncommon hybrid.

498/1. KNAUTIA ARVENSIS (L.) Coult. Recorded for Mull by Wilmott (1942) but without precise locality. We are able to confirm this: Cliffs to north of Tobermory, 1966, BMMS (CANNON & GROVES).

506/7. SENECIO VISCOSUS L. Ulva, roadside near pier, 1966, DUNCAN. Craignure, beside telephone kiosk, 1967, KENNETH & STIRLING (BM). New vice county record.

516/1. ANAPHALIS MARGARITACEA (L.) Benth. Near cottage on Torloisk-Ulva road, 1963, ANNE BOWERMAN; Tobermory, on slope south of the Western Isles Hotel, a remnant from earlier cultivation, 1967, BMMS (MELDERIS).

[540/1. CIRSIUM ERIOPHORUM (L.) Scop, Salen, roadside, 1958, GERRANS 675 (BM), the basis of the published record in Gerrans (1960), has been redetermined as an immature specimen of *C. vulgare*].

550/3. LEONTODON TARAXACOIDES (Vill.) Mérat. In the *Atlas* for Iona and now recorded for the first time from the mainland of Mull. Calgary Bay, fixed sand behind the beach, 1966, BMMS (CANNON & GROVES 268a).

POTAMOGETON—all determined by J. E. Dandy.

577/5. POTAMOGETON LUCENS L. North side of Loch Poit na h-I, 1966, DUNCAN (BM). New vice county record.

577/6 × 5. POTAMOGETON GRAMINEUS × LUCENS (P. × ZIZII Koch ex Roth). North side of Loch Poit na h-I, 1966, DUNCAN (BM). New vice county record.

577/8. POTAMOGETON PRAELONGUS Wulf. Previously known from an unlocalised Mull specimen collected by S. M. Macvicar in 1897. Recently refound at: West side of Loch Peallach, 1966, DUNCAN (BM); South end of Loch a' Ghleannain in 4 ft. of water, 1967, BMMS 260 (JERMY).

577/21. POTAMOGETON PECTINATUS L. Loch na Cuilce, Dervaig, 1967, KENNETH (BM). A new record for Mull, previously only known in V.C.103. from Tiree.

582/1. ERIOCAULON AQUATICUM (Hill) Druce (*E. septangulare* With). Indicated in the *Comital Flora* (Druce, 1932) for Iona, but we have not as yet been able to trace the origin of this record, and it has not been taken up by later authors. However, as it is well known from Skye to the north and Coll to the west, and was last year (1967) discovered on the adjacent Ardnamurchan peninsula, we feel that it might well occur in Loch Staoineig in the south of Iona.

599/1. SCILLA VERNA Huds. Though long known from Iona and the small islands of Staffa and Lunga, this species has been only recently recorded from the mainland of Mull. Rocks east of Ardalanish dunes, 1967, KENNETH & STIRLING (BM).

621/C. CURTONUS PANICULATUS (Klatt) N. E. Brown. Tobermory, ? planted but persisting in native vegetation, 1967, KENNETH. This species, which superficially resembles a robust form of *Crocosmia* × *crocosmiflora* ('Montbretia') and with which it has been confused, has already been noted by the recorder from V.Cs. 98 and 101. For description see Kent, 1964.

624/2. CEPHALANTHERA LONGIFOLIA (L.) Fritsch. Originally recorded by G. Ross from a wood on the east side of Ghurrabain, Druimfin, near Tobermory in 1877 (BM). In 1939 the BEC party 'looked for [it] but not found in Aros Woods'—the area surrounding the Ross locality. It has not been found in that area subsequently. In 1967 it was found on the peninsula south-east of Loch Spelve near Portfield by a B.M. Survey party, BMMS 129 (MOYES).

655/11. SCIRPUS CERNUUS Vahl. Recorded by G. Ross from Iona and confirmed subsequently for the *Atlas*. We have been able to find it on the nearby mainland of Mull on the coast opposite to Erraid. But a gathering collected by G. Ross at Druimfin, near Tobermory (BM), and circulated through the B.L.R.C., is in fact *S. setaceus*.

663/10. CAREX SEROTINA Mérat. Known definitely to us only from Dervaig and Ulva, near Sailean Ardalum. Specimens of this affinity should be carefully collected with habitat notes, because *C. scandinavica*, a closely related species, with somewhat different habitat preferences, may also be involved.

[663/17. CAREX VESICARIA L. Recorded for V.C. 103 by Ewing in 1899. G. Ross in his 1878 paper notes *C. vesicaria* × *ampullacea* (*rostrata*) from Loch Snail and north of Beinn Buie. A. C. Jermy has reidentified the Ross specimens at the B.M. from these localities as *C. rostrata*. There is, therefore, no evidence as yet for the occurrence of *C. vesicaria* in our area, although it is widely distributed on the adjacent mainland.]

663/32. CAREX HIRTA L. Previously known only from Iona, but now recorded from Uisken, on the Ross of Mull, 1966, BMMS (JERMY).

663/54. CAREX PANICULATA L. Further to the old record shown in the *Atlas*, and presumably based on the Ross 1877 List—'Errie' (Erray, near Tobermory), we can now add: North side of Loch Poit na h-I on wet moorland, 1966, DUNCAN; Feith Bhan, near Salen, 1967, BMMS 382 (JERMY).

[663/55. CAREX APPROPINQUATA Schumach. Listed in error in Clapham, Tutin & Warburg (1962) for Mull.]

681/2. MELICA NUTANS L. Calgary, streamside, 1965, KENNETH. New vice county record.

[685/4. AGROPYRON PUNGENS (Pers.) Roem. & Schult. Recorded by G. Ross from Calgary Bay in his 1878 List. A specimen collected and so named by Ross in 1876 at this locality, has been redetermined by A. Melderis as *A. junceiforme* × *repens*. *Both* parents are known from Mull, whereas *A. pungens* is not shown in the *Atlas* for north of the border. It is assumed therefore that the original record is an error and the opinion expressed in appendix II of the *Atlas* is confirmed.]

SOME CHANGES IN THE WEED FLORA OF MULL

A general consideration of the lists compiled by G. Ross, and of other early information, suggests that there have been considerable changes in the occurrence of weed species in Mull since the latter half of the nineteenth century. For instance, *Euphorbia peplus*, which is described as being 'common in cultivated ground', is now recorded only from Iona and then only rarely. *Polygonum convolvulus*, also described as common, has only been found recently in the grounds of Glen Forsa House and on Iona. Similar examples could be added, while casualties of changing agricultural methods like *Agrostemma githago* and *Avena strigosa*, which was described as 'among corn in all the crofts and farms', can be noted. The former appears to be no longer in Mull, while the latter has not been noted since 1939. It seems clear that the change in the pattern of land use, from one involving much small-scale croft farming with associated large estates to one based on forestry and tourism, has brought about these consequent changes in the weed flora. Other weeds of cultivation and waysides, of more recent introduction into this country, e.g. *Matricaria matricarioides* and *Polygonum cuspidatum*, have of course been recorded from Mull since Ross' time.

For these reasons we shall be specially grateful if visitors to the islands will go out of their way to examine cultivated ground, both arable and in association with houses, and make careful records of all the weeds they encounter.

SPECIES APPARENTLY RESTRICTED TO IONA

After the somewhat austere charms of Mull, the small island of Iona offers a very different aspect to the visitor. The impression is at once of a milder climate, while the incidence of wind-blown shell sand produces large base-rich areas, so conspicuously absent from the main island. A number of species have been recorded from Iona, but not from Mull or the other small islands. Recent work has reduced this total, and it is likely that as a result of further intensive field studies, other species on the list below will be found on the Ross of Mull and possibly extending into Brolass. A few species, e.g. *Leontodon taraxacoides*, have been found only at Calgary Bay on the N.W. of Mull apart from their Iona stations. In its western situation, Calgary is also probably somewhat climatically favoured and has some development of wind-blown sand. Study of the list suggests that the relatively large number of weed species concerned may be due to the comparatively high level of agricultural operations on Iona compared to Mull. Records of any of the species listed below from the area apart from Iona will be very welcome.

Allium vineale
Apium inundatum
Brassica napus
Bromus sterilis
Cakile maritima
Carduus acanthoides
Centranthus ruber
Chenopodium bonus-henricus
Coronopus squamatus
Eryngium maritimum
Euphorbia peplus
Fumaria bastardii
Fumaria officinalis
Papaver dubium
Peplis portula
Potamogeton berchtoldii
Raphanus raphanistrum
Sedum telephium
Veronica polita

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NOTES ON THE DISTRIBUTION OF *THLASPI ALPESTRE* L. IN DERBYSHIRE*

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The recent rise in attention devoted to the production of fluorspar in Derbyshire for the steel industries of Sheffield has resulted in an intensive search of old lead-mine spoil heaps for the mineral. In consequence, the specialised habitats for a group of plants adapted to high concentrations of heavy metals such as lead and zinc are being disturbed and gradually destroyed. Of these plants, the Alpine Penny-cress, *Thlaspi alpestre* flourishes in the open communities of the spoil heaps, but once a compact sward has developed, there is a marked decrease in the gregariousness of the plant.

As long ago as 1688, Ray (see Linton 1903) observed this as the habitat for *Minuartia verna*—'in Derbyshire on the barren earth they dig out of the shafts of the lead mines'. This latter plant is relatively common on the spoil heaps and in open calcareous grassland, from Castleton (G.R. 43/150830) in the north, to Wirksworth (43/286540) in the south. But this is not the case with *Thlapsi alpestre*, which is only found in a restricted region south of Youlgreave (43/210643) in the south-east of the limestone plateau.

In the past four years, details of the distribution of *T. alpestre* have been collected in an attempt to appreciate the effects of fluorspar mining on the present and future distribution of the plant. Figure 1 represents the present distribution on a 1 km. square basis, compiled mainly from the author's records and those cited in Linton (1903).

There appear to be four main areas of distribution, namely:—

(1) Youlgreave;
(2) Pikehall (43/192591);
(3) Winster/Bonsall—areas east of Matlock and north of Via Gellia;
(4) Brassington/Cromford/Wirksworth—areas south of Via Gellia.

The localities around Youlgreave are slightly atypical in that they are at a considerably lower altitude (500 feet (152 m)) than all other localities, and in a river basin as opposed to an upland plateau. The northern and western boundary seems to be the valley of the River Bradford, whilst the southern boundary is formed by an outcrop of shale and gritstone. The Pikehall locality in a side-arm of Long Dale at an altitude of 900 to 1,000 feet (274–304 m) is the most westerly occurrence of *T. alpestre* in Derbyshire, and isolated from the main populations. Pastures to the east, on Elton Common (43/210598) and Blake Low (43/221602) have spoil heaps which are associated with deeper

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*For a recent paper relative to this study see Ernst, W. Zur Kenntnis der Sociologie und Ökologie der Schwermetallvegetation Grossbrittaniens. *Ber. dt. bot. Ges.*, **81**, 116-124 (1968).—(D.H.K.)

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mines, and consequently, are comprised largely of overburden rather than gangue minerals such as fluorspar and barytes. Presumably, a great capacity for heavy-metal tolerance is not required here and the heaps are now reverted to pasture with an unbroken grass sward. This, however, is not the case throughout the region, and *T. alpestre* is often found on the debris associated with deep mines.

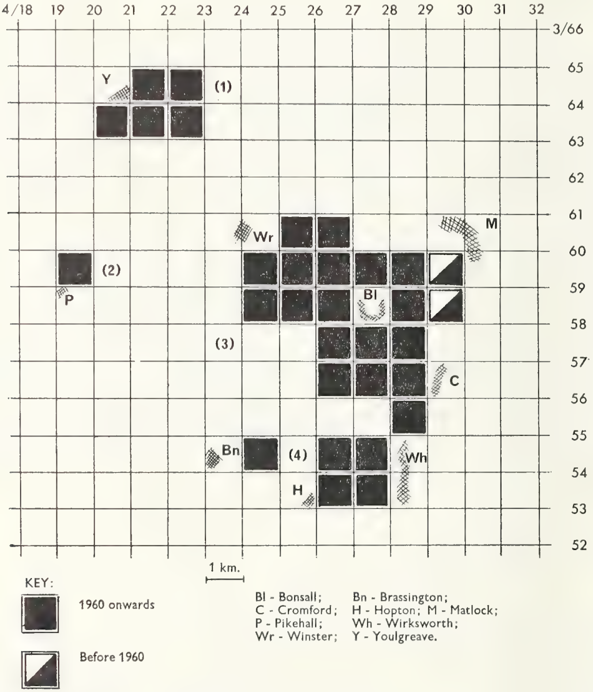

FIGURE I. Distribution of *Thlaspi alpestre* L. in Derbyshire.

The third area from Winster to Bonsall represents the centre of the distribution, and *T. alpestre* is relatively common on the uplands of Bonsall, Slaley, and Masson Moors (43/255595, 265575, 285585). In the region to the south of Via Gellia the plant is also quite common, especially in pastures to the north and west of Hopton (43/260532). There is a small isolated population at Carsington Pasture (43/245545), in an area with more Triassic silica than lead mine spoil heaps.

These areas represent about one eighth of the theoretical possible distribution of *T. alpestre* in Derbyshire, assuming that it may colonise the open ground of other similar spoil heaps. The absence of the plant from spoil heaps in the greater part of the mining region of Derbyshire tends to negate the theory that the seeds were dispersed by transient miners, unless *T. alpestre* was adventive in a period when only mines in the south-east were in operation. But there is substantial evidence that there has been mining in most parts of the region since Roman times.

There appears to be no great difference in environmental factors and one is left to explain the present distribution pattern by the survival of the plant during the Late Glacial period in *refugia*, and its subsequent spread via the development of heavy-metal tolerance. Possible *refugia* would be the limestone cliffs at Matlock Bath (43/298590) and in several places in Via Gellia. If this

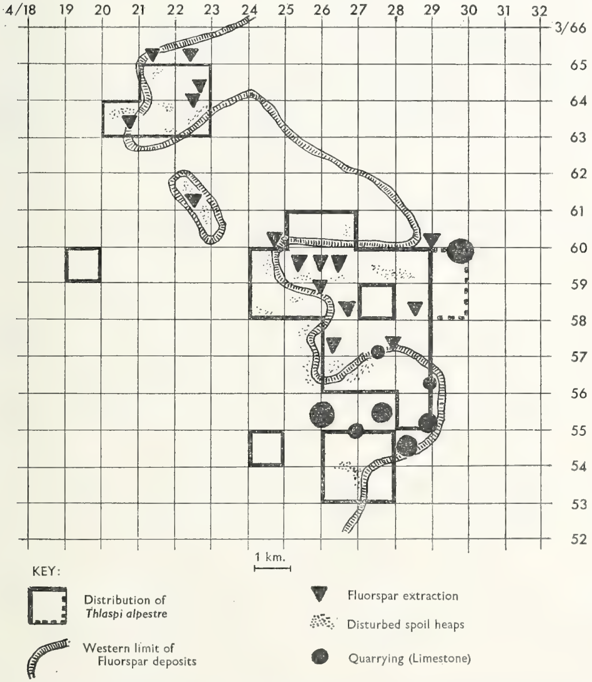

FIGURE 2. Mineral Extraction, and the Distribution of *Thlaspi alpestre* L. (modified from Foster 1955).

is so, could the plant not survive in other steep, rocky dales such as Stoney Middleton and Bradwell, and spread to the spoil heap complexes of Eyam (43/220765) and Bradwell Moor (43/140800)?

Figure 2, based on Foster (1955) but brought up to date, shows the occurrence of fluorspar and the chief mining areas in the south-east of the limestone plateau. More widespread are the areas around the western fringes of the fluorspar distribution where part-time operators have picked over 'the spoil heaps' in the search for evidence of a greater deposit of fluorspar. Also shown are the limestone quarries which, in the Wirksworth area, are extremely extensive, and to some extent serve to limit the distribution of *Thlaspi alpestre*.

The final question which arises from the foregoing data is, 'Will the exploitation of the spoil heaps for fluorspar cause the extinction of *Thlaspi alpestre*?' Within the 1 km. squares, the actual populations of *T. alpestre* are small and restricted due to the gradual formation of a compact grass sward, the constituents of which compete strongly with *Thlaspi*. In all, eight populations where the number of individuals per sq. metre averages 50 or more have been noted, whilst the majority of counts revealed an average of 15/sq. metre. It could be that the Derbyshire population of *Thlaspi alpestre*, as a whole, is at present in a decline owing to the inability to compete with grasses. If this is the case, then perhaps the creation of new open habitats will allow *Thlaspi*, with its inbreeding mechanism, to recolonise these habitats and maintain itself in Derbyshire.

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THE FULLER'S TEASEL

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Two subspecies of *Dipsacus fullonum* L. are generally recognised (Clapham, Tutin & Warburg, 1962):

1. subsp. *fullonum*, the Wild Teasel, Cardère Sauvage (French), Wilde Karde (German), with the involucral bracts curving upwards and the receptacular bracts exceeding the flowers and ending in a long straight spine. The receptacular bracts are too flexible for the heads to be used for combing cloth. It is found as a native plant in Britain growing on clay soils in the south and east where it is to be seen frequently in copses and in rough pastures by roadsides.

2. subsp. *sativus* (L.) Thell., the Fuller's or Cultivated Teasel, Cardère Cultivée (French), Weber Karde (German), with the involucral bracts spreading more or less horizontally and the receptacular bracts almost equalling the flowers and ending in a stiff recurved spine. The heads are used for raising the nap on some kinds of cloth. It is an introduced plant in Britain and is usually found in a wild state only on rubbish dumps.

It may not occur immediately to those who have not examined this subject that Rural Studies provides an intellectual exercise and the opportunity to develop practical skills, and can be the focus in an area of work integrating other subjects of the curriculum. To illustrate this we selected the Fuller's Teasel as a starting point and brought in the full resources of all our departments to develop the subject. Discovering the Fuller's Teasel has proved fascinating. Little has been written on the subject and therefore all our work has had to be carried out 'in the field.'

Teasels play a little known part in the manufacturing of many textile fabrics. The stiff needle-like bracts which form just below the flowers in the head or burr are used to raise the 'nap' or 'pile' of the cloth to produce desired finishes on specific fabrics. The cultivated form of this plant is commonly called Fuller's Teasel, because the gigging or napping operation in a mill is done under the supervision of the fuller, who supervises the fulling, or felting of the fabric. Teasel occurs in Anglo-Saxon, before the English Language as we use it had evolved, and is directly related to the word 'tease'—not in the later sense of annoying but referring to the act of disentangling fibres. *Dipsacus* comes from the Greek and means a little cup for holding water. This little cup is to be found at the base of the leaves, and girls used to believe that the drops of water collecting there had cosmetic properties. They would dab the water on warts, wrinkles and freckles in the hopes of removing these blemishes and making the 'face fair.' Venus' Basin, the girls of long ago termed the connate base of the teasel leaves where the water collected. The drops of water were also considered, by some, as a remedy for bad eyesight (Johnson, 1862). One would assume that this water also played a part in the life of the plant perhaps by being absorbed in case of necessity. From observations on our own cultivated plants we noticed that the leaf-cup forms a death trap for numbers of insects. Flies of various kinds were drowned in these cups and one would conclude that the teasel is partly insectivorous and derives a certain amount of nourishment from their decomposing bodies. Other authorities have made such deductions but we were unable to find any experimental evidence to support our supposition. Gerard (1597) refers, in his *Herbal*, to an old superstition that the little worms or maggots found in the heads of the wild teasel, if worn round the neck of a sick person will act as a charm and restore him to health.

The use of the teasel is centuries old and references to its use can be found in Roman history where it was used equally with hedgehog skins for the raising of the nap on cloth. In English history we found records of cultivation going back as far as Richard I (1189) and references to it being a ‘popular crop’ in the time of Edward III (1327). There is even a record of tithes being paid on teasel plants grown at Winscombe, in the County of Somerset, in the early part of the eighteenth century.

The cultivated teasel was at one time grown in large quantities in England, mainly in Somerset, Essex and the East Riding of Yorkshire. Nowadays, because of the uncertainty of the English climate and rising labour costs, the teasel buyers now obtain their supplies from France, Spain or Italy. Teasels are also cultivated as a crop in the State of Oregon and until recent years were also raised near the town of Skaneateles, New York (Nelson, 1960).

In step with progress a ‘metal teasel’ has been manufactured but the quality of nap raising produced is inferior to the quality of raising given by the natural teasel. Economically, however, the metal teasel is far in front of the natural one. In view of this development many mills have installed machines using the ‘metal teasel’ for carrying out the initial raising of the ‘nap’ but still finish their ‘pieces’ of cloth on a machine using the natural teasel. It is gratifying to know that the natural teasel is still ahead of any invention for the raising of the ‘nap’ on cloth.

Much of our field study work was carried out in Somerset which is now practically the last home of the teasel-growing industry, the area of production being almost entirely that of Curry Rivel, Fivehead and Curry Mallet. The ‘Somerset Teasel’ is thought by some to owe its survival to the Huguenots, the French Protestants of the sixteenth and seventeenth centuries, who as refugees settled in the West of England and were probably responsible for the resurgence in the West of England cloth industry.

THE ENGLISH INDUSTRY

Teasel seed is sown during April or early May on a very fine seed bed. Seed should be sown at a depth of about one and one-half inches in rows set at ten inches apart. After sowing the ground benefits from the treatment of a roller. When the plants appear they are kept weed-free by hoeing. During the summer months spraying is carried out at fourteen day intervals to prevent ‘teasel fly attack’ caused by *Phytomyza ramosa* Hd. (Agromyzidae) to counteract which Malathion and D.D.T. have both proved successful.

By November the young plants will have produced a tap root; this is cut through some three inches below ground level, the plant lifted and transplanted in freshly ploughed land, in rows two feet six inches apart and about fourteen inches between each plant. Teasels are biennials and in their second year of growth will throw up a main stem with numerous side branches. These are crowned with prickly cylindrical flower heads, blue in colour. There will be between ten to forty flower heads to each teasel plant. To a stranger a field of teasels in flower has often been taken for a field of thistles. The teasels should have lost all their flowers before the heads are reaped. This is helped by thousands of bees of all types. Some apiarists consider teasels as a very good crop for honey production, and delicious honey it is too. Cutting, as with all teasel work, is done by hand using a crescent shaped knife held in the palm of the hand and tied to the leather, protective glove. As they are cut the teasels are made up in bunches of forty or fifty heads then bound round with a long teasel stem. An experienced cutter can cut up to ten thousand teasels per day. For this he would earn about four pounds as this part is done on a piecework basis only. At the end of the cutting day the bundles are placed on eight to ten feet poles in a criss-cross fashion. A nail or peg is driven through the ground end to keep the teasels off the damp ground and also prevent them from sliding off the poles. The next job is drying. This must be done very carefully or moulding will result. One of the best ways is to use an open shed with a sound roof but with no sides. This type of structure will allow the air to flow freely round the poles when they are stacked in it. Teasel cutting, which usually commences in the first week in August, lasts about three weeks or more. This is due to the fact that the smaller teasel flowers flower later than the main larger ones which means that the field has to be cut over three or more times to reap the full crop. An average crop would yield about two hundred thousand heads per acre, or, as is known by teasel growers ten 'Packs' per acre. During October the teasel buyers arrive from the north of England, but they are very limited today and the industry barely remains. After a short time spent bartering over a price a deal is made. The teasels are then taken off the poles and packed in very large sacks, supplied by the buyers, and sent to the north of England, where they are trimmed, graded and sold again to the cloth mills.

The main stalk produces the largest and strongest teasel, known as the King; the terminal of the main branches produces the Queen teasels of medium size and the secondary branches produce the button teasels. The quality of the teasel is measured in its elasticity or 'give', retention of spines, weight or size, wearing qualities and brittleness. It is believed that these characteristics are greatly influenced by soil and climatic conditions and the kind of seed planted. Dry harvest seasons are generally preferred wherever teasels are grown, as such weather insures not only the proper maturing of the burrs on the plant but curing after harvest. Long periods of incessant rains or damp weather cause water to collect in the bracts of the burr, which weakens or rots it. With variable weather, the quality of the teasels is not uniform from year to year.

In use, the teasels are arranged on a cylinder in such a way that the cloth passes slowly over them while the cylinder revolves. Thus the recurved hooks catch the fibres of the cloth causing them to stand up from the surface of the cloth to form a pile or 'nap' which, if desired, may be sheared to cut the fibres down to a uniform length. Great care has to be taken when mounting the teasels in the frames to be fastened on the cylinder of the teasel 'gig' machine. It is the work of a craftsman to mount the teasel so that they will work uniformly, and not produce an uneven raising by bearing heavier on the fabric at one point than at another. The teasel 'hook' is strong enough for the work and yet elastic enough to 'give' before the fibres break. Broad Cloths, Face Cloths, some Worsteds, Mohair Fabrics and blankets are examples of fabrics which are raised.

THE INDUSTRY ABROAD

From here our studies made an assessment of Fuller's Teasel in Italy, France, Spain and in the United States. Here much of the work was done by our Language Department. It was an extremely interesting exercise to compare methods of cultivation and use together with the economics of its cultivation. The Departments of Agriculture in the above countries were most helpful and interested in our work. A noteworthy feature in France is 'The Society For The Protection Of The Teasel' founded in 1962 (Bastide, 1964). An interesting historical fact is that the 'Popes' of Avignon awarded prizes to the grower cultivating superior teasels which were then used in the manufacture of the cloth for their vestments.

We introduced weaving, as a craft subject, in the school through our investigations into the use of the teasel and are still producing handwoven stoles, skirt lengths, tie and waistcoat lengths, the 'nap' of which we raise by hand, using a 'teasel cross'. The shape of the teasel head inspired many designs for hand made pottery and embroidery work. Investigations into the use of the seed in bird-seed mixtures occupied our young ornithologists, with various experiments and seed analysis, for many months. Our chemists were also kept fully occupied looking into the medicinal properties of the root.

Most people are familiar with the use of teasels either in their natural state or dyed in flower decorations but an interesting idea came out of our research into German customs. During the winter months in Germany, when flowers are in very short supply and extremely expensive, teasels are used woven in with small branches of fir and laurel in the making of mortuary wreaths.

Some three hundred children were involved in our work which took eleven months to complete. Many week ends and holidays were spent in the 'teasel field'. If only through this work in the school we have introduced a greater number of children, than take Rural Studies as a subject of study, to the 'wonders of nature' we have widened their appreciation of the practical world in which we live.

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EUPHRASIA STRICTA Lehm. IN GUERNSEY

P. F. YEO

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In August, 1958, a gathering of *Euphrasia* from Guernsey was sent to me by Mr David McClintock, and was determined by me as follows: *E. stricta* Lehm., two plants; *E. tetraquetra* (Bréb.) Arrond. (*E. occidentalis*), one plant; *E. ?tetraquetra* × *E. stricta*, two plants; *E. nemorosa*, one plant. The locality was: Calais, meadow at top of path up from Bec du Nez. Seeds were extracted from the plants determined as *E. stricta*, and in 1959 ten plants were raised from them at Cambridge under my serial number, E777. Whereas the parents were fairly characteristic of *E. stricta*, the cultivated plants differed in their short internodes, especially at the base, and in their rather profuse branching (Fig. 1b & c). However, the rather narrow, sharply serrate upper cauline leaves (nodes 9–10) and the long fine teeth of the bracts and calyces are so pronounced (Fig. 1d & e) that I consider these plants definitely referable to *E. stricta*. A description of this species can be found in my account of another British occurrence of *E. stricta* (in Buckinghamshire) (Yeo, 1962). In *E. stricta* the basal pairs of teeth of the bracts are usually antrorse, like the distal ones, and although this is not apparent in the bracts illustrated it becomes so two or three nodes higher in most of the cultivated specimens. There is no particular evidence to suggest that the abnormal habit is the result of hybridisation. It could be derived from *E. tetraquetra* but there is no trace of this species in the other characters of the plants. Plants resembling *E. confusa* occur in the Channel Islands, and hybridisation with this species could possibly have produced the habit of the plants under consideration. These *E. stricta* plants differ from *E. confusa* in their stout and rigid, rather than slender and flexuous, stems and main branches, as well as in the more oblong shape of the upper cauline leaves and finer bract and calyx teeth (*E. confusa* is, however, more like *E. stricta* in foliar characters than is *E. tetraquetra*).

After the cultivated plants were pressed, the original gathering was kindly sent to me again by Mrs F. Le Sueur, and Mr McClintock collected further specimens on 30 Sept., 1961. The original specimens now seem to me to have been somewhat misdetermined; the '*nemorosa*' and the supposed hybrids seem to be *E. stricta* also, while the supposed *E. tetraquetra* looks as if it might be *E. stricta* × *E. tetraquetra*. The 1961 specimens were very old and dwarfer than those collected in 1958, but they also appear to represent *E. stricta* and have been placed in the Cambridge Herbarium (CGE). The flowers of this form of *E. stricta* are rather small, those of the cultivated plants measuring 6·5 to 7·5 mm along the upper lip (and including the lobes), while the lower lip is a mere 4 to 4·5 mm wide and is narrow-lobed. These proportions make the flower relatively long-tubed in relation to the size of the lower lip.

Seven specimens of the cultivated *E. stricta*, E777, are in my own herbarium and three more are in CGE. Seven of the plants were grown with *Medicago lupulina* as host plant, and three with *Plantago coronopus*. Performance on the respective hosts could not be compared owing to differences in date of potting-up, size of pot and number of hosts and parasites, but good growth was obtained with both.

It may be mentioned here that Channel Island *Euphrasiae* are usually difficult to determine; plants showing characters of *E. nemorosa*, *E. tetraquetra* and *E. confusa* are met with, but the characteristic combinations of features of these species are rarely fully realised. In fact, two other samples based on

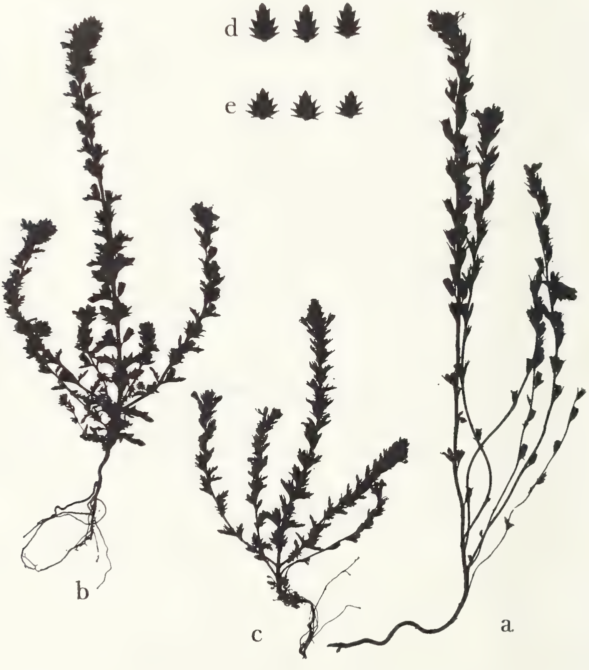

FIGURE 1. (a) Pressed plant of *E. stricta* from Guernsey, coll. D. McClintock, August 1958. (b), (c) Progeny from two plants of this gathering, cultivated at Cambridge, pressed 18 August, 1959. (d) Leaves from node 9 or 10 of the cultivated plants. (e) Bracteal leaves from node 13 of the same plants. × ⅔.

Mr McClintock's collecting were also cultivated in 1959, and it was possible to conclude only that one (from Sark, E775) was *E. tetraquetra* but not typical, and that the other (from Alderney, E774) was perhaps some hybrid of *E. tetraquetra*.

Since this note was written, Mr McClintock has sent me a herbarium sheet of the same form of *E. stricta*. The specimens are compact and very like my cultivated specimens (Fig. 1 b, c). Particulars are as follows: L'Ancresse Common, Guernsey, Aug. 1893, M. Dawber (St Peter Port Herbarium).

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PLANT NOTES

29/P. Pteris vittata L., 1753, *Sp. Plant.*, 1074; *P. longifolia* auct. non L. V. c. 23, Oxford, on the external wall of the tropical greenhouses, Botanic Garden, Oxford, July 15, 1967, Frances M. Jarrett (Herb. Kew).

This fern was mentioned recently in these Notes in connection with the discovery of *P. vittata* on a burning slag heap in the Forest of Dean (Lousley, 1964)*. The Oxford colony, which extends some way along the old brick bases of the new greenhouse, is almost certainly descended from the plants recorded 'on the Conservatory wall' by Druce in 1924 as *P. longifolia* (Druce, 1925). The walls have been partly repointed but the ferns grow in the old mortar where there is slight seepage from the interior. Examination has now shown that these plants should be referred to the Old World species *P. vittata*, which is widely distributed in warm temperate and tropical regions, and not to *P. longifolia*, which is limited to strictly tropical areas in the New World. Both species have pinnate fronds with narrowly lanceolate, undivided pinnae and the best distinguishing character is found in the attachment of the pinnae. In *P. longifolia* there is a clear articulation at the junction with the rachis, whereas in *P. vittata* the pinna stalk is decurrent on to the rachis as a low ridge without any constriction.

The two species have long been confused. Although *P. vittata* is native in southern Europe, it seems likely that *P. longifolia* was the first to be introduced to England. The earliest record appears to be given by Aiton (1789) who states that it was introduced from the West Indies by James Gordon in about 1770 (not 1720 as given in Lousley, 1964). No date can be given for the introduction of *P. vittata*, which has passed generally as *P. longifolia* and, presumably owing to its wider range of tolerance, appears to have almost completely ousted the New World species as a greenhouse plant, so that most plants now grown as *P. longifolia* prove to be *P. vittata*. The Oxford plants are assumed to be the basis of the inclusion of *P. longifolia* by Druce (1928) in the second edition of the *British Plant List*. It must now be concluded that the New World species has never gained even this tentative foothold as a British plant. On the other hand, a second record is gained of the ability of *P. vittata* to maintain itself out of doors in England in an exceptional and admittedly artificial environment.

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—F. M. Jarrett

15/2 × 14/1. Asplenium billotii × Phyllitis scolopendrium = × Asplenophyllitis microdon (T. Moore) Alston

This is the very rare, sterile, triploid hybrid between *Asplenium billotii* F. W. Schultz (*A. obovatum s.l.*, *A. lanceolatum* Huds., p.p.) and *Phyllitis scolopendrium* (L.) Newm. This was first collected, in 1855, by a Miss Wilkinson on a rough wall at St. Peter's in Guernsey.

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* For an account of a visit to the Forest of Dean habitat in May 1968, see Holland, S., *J. N. Glos. Nat. Soc.*, **19**, 318-321 (1968).—F.M.J.

Later, according to Marquand's *Flora of Guernsey* (1901), it was found in other stations in the island, on banks of rough masonry without mortar, by Miss Mansell of the Quesne (? Le Chene), and Mr C. Jackson (discoverer of × *A. jacksonii* in Guernsey in 1856). It was said to grow with *A. billotii* at some distance from the sea. One of the later localities seems to have been at St Peter's, where it was discovered in 1885, but the other was kept secret and seen by nobody else, although often searched for. There is a specimen of this plant collected by a Mr Griffiths in 1863 in Guernsey in the Herbarium at Oxford (OXF), and there are various others in existence from Guernsey collected during the latter half of the last century, for example in the British Museum (BM) and at Kew (K). One of these, which has recently appeared, is in Derrick's Fern Herbarium in the possession of the Société Guernesiaise at St Peter Port (STP), undated but from a cultivated specimen.

The only other definite record of this plant from the British Isles is from the village of (?) Gullen five miles inland from Penzance, found by Mr G. Wager in 1856. No specimen has been seen to support the 1862 N. Devon record.

In addition a plant was collected in Jersey in 1880 by a Mr Sinel, which was said to be intermediate between *Asplenium billotii* and *A. microdon* and was dubbed var. *sinelii*, whatever the validity of this christening may have been. This plant was said to have been collected at Bagot. Mrs le Sueur tells me that Bagot is, in effect, part of St Helier, and provides no likely locality for such a fern. There is however a hamlet called Ville Bagot just south of Greve de Lecq at the N.W. corner of Jersey, which has a shady lane which might well have suited this fern. It is perhaps note-worthy that the only Jersey specimen of × *A. jacksonii* collected by E. H. N. (who was he?) in November 1863, came from Greve de Lecq. I have failed to locate any specimen of the former plant, but it does seem just possible that the two were the same. On the other hand, in later life Mr Sinel said he thought it was Gorey where he collected this fern, which is in the N.E. corner of the island.

Since those days nothing had been seen of this hybrid anywhere until the summer of 1966, when Mr P. J. Girard, Headmaster of the Castel School, spotted a tuft on a barish, heavily-shaded, lane bank at Les Effards in Castel parish. The bank was unsafe and Mr Girard therefore collected the fern and put it in a special compost in a large pot at home. So well has he looked after it, that it is now a clump of 12-ins or 15-ins across in superb condition. The frond exhibited at the 1967 Exhibition Meeting came from this plant. Specimens from it have been seen by others, in particular by Mr A. C. Jermy and Dr J. D. Lovis, who have examined it cytologically. Dr Lovis and Mr Girard have published a paper in the *British Fern Gazette* (*Br. Fern. Gaz.*, **10**, 1-8, (1968)) on this excellent discovery, important also for its value in experimental work; and Mr Girard is preparing a further account for the *Transactions of the Société Guernesiaise*.

But this was not all, and the excuse for exhibiting this hybrid was that a second tuft of this plant was discovered in 1967, and again by Mr Girard, from his car. This was on another barish, heavily-shaded, lane bank in another part of Guernsey, St Saviour's parish. When we visited this locality in October of that year, we went to see the owner of the ground it grew on, who promised to look after it.

We made a note of the plants growing on the two banks and found the lists were almost identical except that in Castel the canopy was formed by elms and in St Saviour's by oaks. The composite list is as follows:—

× *Asplenophyllitis microdon*
Asplenium adiantum-nigrum
Asplenium billotii
Phyllitis scolopendrium
Dryopteris filix-mas
D.dilatata
Polypodium vulgare subsp. *prionodes*
Ranunculus repens
Silene dioica
Rubus fruticosus s.l.
Umbilicus rupestris
Hedera helix
Smyrnium olusatrum
Rumex acetosa
Festuca rubra
Dactylis glomerata
Brachypodium sylvaticum
Arrhenatherum elatius

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—D. McClintock.

168/i, p, i × p. Geranium ibericum Cav., G. platypetalum Fisch. & Mey. and G. × magnificum Hyl.

There are countless references in print to *Geranium ibericum* or *Geranium platypetalum* or *Geranium ibericum var. platypetalum* in or outside gardens. The precise name given to any one plant seems usually to display an unawareness of the characters of the species.

In 1960 N. Hylander looked into this matter and in 1961 published a paper on the subject (Föreningens för dendrologie och parkvård årsbok Lustgården 1961, 109-114). And we are much indebted to Mr Clive King for translating this paper.

Hylander dealt first with the two species *G. ibericum* Cav. and *G. platypetalum* Fisch. & Mey.—both from the Caucasus (*ibericum* here refers to an old name for the Province of Georgia, and not to the Spanish Peninsula). Not all the distinctions he attributed to the two species work, but the leaves of *G. ibericum* are much more deeply toothed and lobed and in particular the indumentum on the sepals and pedicels differs very clearly. In *G. ibericum* it consists of a mixture of short and very long eglandular hairs, while in *G. platypetalum* they are all glandular.

In addition Hylander described a new taxon, *G.* × *magnificum*. This combined the two types of indumentum, long eglandular hairs with shorter glandular ones, the leaf shape was intermediate and the plant was sterile. He deduced therefore that this was a hybrid between the two species. D. McC. has examined dozens of clumps of *Geraniums* of this group and every one has proved to be the sterile hybrid. This also accounts for the fact that naturalised clumps never spread far, merely getting larger and larger and, presumably with some hybrid vigour, often competing well with native vegetation in places where they had been outcast or otherwise placed. Opinions will vary on the extent to which such a sterile runnerless plant can be considered naturalised, but it is not rarely to be seen happily and floriforously on its own on roadsides etc., sometimes well away from houses. Indeed so widespread is it that the first guess for any plants of this group should be *G.* × *magnificum*. Should any naturalised plant prove to be otherwise this should call for published comment.

The two presumed parents may very rarely be seen in a few, mostly botanic, gardens, although any label to that effect must be at first suspect.

The chromosomes of *G. platypetalum* and *G. ibericum* ("var. *talyshense*") were counted by E. F. Warburg, who found $2n = 28$ and $2n = 56$ respectively. He also counted $2n = 42$ in what he called "sterile *G. platypetalum*", and there can be little doubt that this was *G.* × *magnificum*, though no voucher specimen has been traced.

One other taxon must be referred to, *G. jubatum* Handel-Mazzetti which also comes from the Caucasus, of which there are specimens at Kew. This is indistinguishable from *G.* × *magnificum*, except that it is fertile, which suggests that its chromosome number is $2n = 84$ and that it is an amphidiploid. This species is not known in cultivation, but strictly no plant with mixed glandular and eglandular hairs should be referred to as *G.* × *magnificum* without checking that it is sterile.

Specimens of all four taxa were exhibited at the 1967 Exhibition Meeting, and the proof of an article for the *Gardener's Chronicle* of 6 Dec. 1967 p. 11 was also shown.

—D. McClintock & P. F. Yeo.

178/1. Buxus sempervirens L.—In Bourton Combe Gorge, Somerset.

At the lower end of Bourton Combe gorge the rocky cliffs rise precipitously for some 40-50 feet on the northern side. Across the face of the cliff the carboniferous limestone has crumbled away leaving ledges on which soils have collected and formed. The larger ledges have a shallow clay subsoil, 1-3 inches deep, and this is covered by woodland leaf mould to a depth of 5 inches. The depth is sufficient to support much stunted plant life including three specimens of *Buxus sempervirens*. The largest of the three is estimated to be about 100 years old. Although the woodland has been extensively searched, no trace of other *Buxus* specimens has been found. Since the area is privately owned, the possibility that *Buxus* had been used as shooting cover was investigated but it appears that the woodland has never been frequently 'beaten', nor productive (gamewise), and the planting of *Buxus*, therefore, was not considered worthwhile, especially since enough cover was provided by *Ligustrum vulgare*.

The precarious position of the specimens further suggests that they are not purposely planted. Perhaps they are bird sown plants and possibly their parentage is cultivated stock. Nevertheless, there seems no doubt that they are natural occurrences of a plant species that is native to this country.

However, whether *Buxus* is indigenous to Somerset carboniferous limestone or not is a suggestion which will be debated for many years—at Blackwell we think it is!

—BACKWELL COUNTY SECONDARY SCHOOL, BRISTOL

254/1. EPILOBIUM HIRSUTUM L.—Pink flowered forms.

On the 9th August, 1964, I noticed at Barnstaple, N. Devon, a small clump of ordinary Greater Willowherb with pure pale pink flowers. In fact, the flowers opened almost white and faded to Persian Rose (H.C.C. 628/3). The effect was not unlike apple blossom, and a big improvement on the normal magenta-puce. Seed from this plant was germinated and all but two of the seedlings came true. A root I took at the same time, which was planted elsewhere away from the normal form, has produced only pink-flowered seedlings.

This is a colour form known elsewhere, although I can trace only one mention of it in print (Bowles, 1914), from Cheshunt, Herts. I myself saw it again, on the 27th July, 1967, down Graves Lane, Edingley, Nottinghamshire in considerable quantity, together with the normal form; and was told of it later that year from near Gravesend, W. Kent. Nor, I am quite sure, are these the only places where it is to be found. Colourwise it is garden-worthy, and as such should bear a distinctive name, say 'Apple Blossom'. But prospective cultivators should be aware that in some soils it may seed itself over-eagerly.*

—D. McCLINTOCK

BOWLES, E. A. (1914). *My Garden in Summer*, p. 276. London.

370/3. LYSIMACHIA VULGARIS L.—In the Isle of Man.

The indigenous status of this species in this country seems to be so generally taken for granted that it may be salutary to report an instance where this has recently been proved, more or less conclusively, not to be the case.

In the Isle of Man the species was for long a conspicuous absentee from the known flora, until in 1944 a very large colony, extending for at least half a mile, was discovered in an under-explored stretch of bogland in the centre of the island (1945, *Peregrine*, **1**, 27). As the discoverers remarked, 'it can be quite easily seen from the railway line' (and it must be remembered that Manx trains, because of their miniature size, are a good deal slower than elsewhere) and it was therefore curious that no one with even a slight botanical knowledge had hitherto noticed these very striking splashes of yellow. This should have aroused suspicion, but it did not—until very recently.

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*Mr N. D. Simpson has drawn attention to his and Mr J. P. M. Brenan's reference to this form in *Proc. R. Ir. Acad.*, **52**, sect. B, p. 67 (1949). They found it by the Six Mile Water near Antrim and at Dunadry in 1939.

Intensive investigation of the Manx flora has since brought to light quite a number of instances of this attractive plant being grown in cottage gardens and sometimes escaping from these and growing in semi-wild conditions. It was possible, however, that these garden stocks had all been derived originally from the one seemingly indigenous colony, the existence of which could well have been known to the local country people even if not to local botanists.

A careful re-investigation in 1967 has now disclosed three pieces of evidence which, taken together, seem to indicate without question that the colony, despite an at first sight thoroughly innocent appearance, is in fact merely an escape. Firstly, the plant is not evenly distributed over all the suitable parts of the boggy area in question, as one might reasonably expect; it is, instead, strongly concentrated close to the sides of the stream flowing through the area. Secondly, it is obviously spreading; for it has colonised a number of dry, man-made drainage banks which can hardly have been long abandoned. Thirdly, and far more damningly, the plants prove to have the invariably terminal inflorescences, larger corollas and red-based petals characteristic of the hortal form known as 'var. *grandiflora*'.

As the species may well be a garden favourite elsewhere in the north and west of the British Isles—it was apparently renowned in the Middle Ages as a protection against flies and gnats, so may have been grown herbally—the status of wild populations there may merit a more critical assessment. —D. E. ALLEN

430/2 × 3. VERONICA ANAGALLIS-AQUATICA × CATENATA—At Meonstoke, Hampshire.

A prolific growth of an unusually large aquatic *Veronica* was observed along the banks of the River Meon at Meonstoke, Hants. early in July, 1967. The plant was suspected to be a hybrid between *V. anagallis-aquatica* and *V. catenata* and this identification was confirmed at the Royal Botanic Gardens at Kew.

The most striking feature of the plants was their height, (100 cms. +) and their vigorous powers of regeneration when cut down. They root readily at the nodes, even high up on the inflorescence.

It has been stated on p. 690 of the 2nd edition of *The Flora of the British Isles* by A. R. Clapham, T. G. Tutin and E. F. Warburg (1962) that these particular hybrids do not form capsules, but these Meonstoke specimens do seem capable of forming some from not more than 5% of the flowers. Some capsules have been collected for examination for viable seed. It may be that these hybrids are polyploids and an endeavour is being made to check this by a chromosome count.

—R. V. WELLS

569/1. LLOYDIA SEROTINA (L.) Reichb.—New locality in Radnorshire, V.c. 43.

On April 12th, 1965, a single specimen of *Lloydia* was found on Stanner Rocks, Radnorshire. The plant was collected in error as it was growing in a large cushion of the moss *Dicranum scoparium*, which was picked off a high ledge. The plant would probably have been overlooked had it not been in flower on a date two months earlier than usual. The plant was 3 in. high measured from the neck of the bulb but half of the stem was immersed in the moss cushion. It had a single flower and three filiform leaves.

Although this arctic-alpine species has a wide distribution it is very local and has previously only been recorded in Britain from Snowdonia, where it grows at an altitude of about 2,250 ft. (685 m). In Europe it is found in the Alps and Carpathians at altitudes between 4,500 ft. (1,371 m) and 10,000 ft. (3,048 m). On Stanner Rocks it was found at an altitude of about 450 ft. (137 m), well below arctic-alpine conditions, and this may account for its early flowering. As in Snowdonia it was found on rocks facing east. Stanner Rocks consist of Silurian limestone and have a rich flowering plant and bryophyte flora including *Viscaria vulgaris* and *Veronica spicata* subsp. *hybrida*. The nature of the parent rock may not be very important as *Lloydia* always grows in pockets of soil and moss which are neutral or slightly acidic. The dominant species near the exposed ledges were *Festuca ovina* and *Thymus drucei*, with numerous mosses on the rock itself.

It seems most likely that *Lloydia* reached Stanner Rocks from its station in Snowdonia by bird-dispersed seed. It is surprising that it had become established at such a low altitude. —R. F. O. Kemp

683. Bromus (section Ceratochloa)—In Britain.

The section *Ceratochloa* (Beauv.) Griseb. of the genus *Bromus* is represented in Britain by the following three introduced species: *Bromus willdenowii* Kunth, the Rescue Grass, a native of S. America, *B. carinatus* Hook. & Arn. and *B. marginatus* Nees, both natives of western N. America.

The Rescue Grass, which is an excellent forage grass, has been introduced into many countries, including Britain. The nomenclature of this brome has been a subject of controversy. It has been called either *Bromus catharticus* Vahl, 1791, or '*Bromus unioloides* Kunth', or *Ceratochloa unioloides* (Willd.) Beauv.

As shown by Hubbard (1956) and by Parodi (1956) Vahl's *B. catharticus* is a *nomen confusum* and consequently, according to the *International Code of Botanical Nomenclature*, is to be rejected.

Raven (1960) has pointed out that the name '*Bromus unioloides*' has been applied to two distinct S. American species, well-characterized by morphological differences.

The first species is *B. willdenowii* Kunth, 1829, the correct name for the Rescue Grass. It is indigenous in the pampas of S. Brazil, Uruguay and north-eastern Argentina. In Britain it is fairly widespread, but uncommon on waste and cultivated land. Originally this brome was described by Willdenow in 1803 as *Festuca unioloides* from cultivated specimens in Berlin, raised from seed from 'Carolina'. If *Ceratochloa* is considered to be a separate genus, the correct name for the Rescue Grass is *Ceratochloa unioloides* (Willd.) Beauv., 1812.

The second species is *Bromus unioloides* Kunth, 1815, which is also a native of S. America, occurring along the Andes, from Colombia to the Straits of Magellan, and the steppes of Patagonia. In *Ceratochloa* its name is *C. haenkeana* Presl, 1830.

According to Stebbins (1949) and Hall (1955), experimental crossing of *B. willdenowii* (*B. catharticus*) and *B. unioloides* (*B. haenkeanus* (Presl) Kunth, 1833) produced highly sterile first generation hybrids, in spite of the fact that the somatic chromosome number of both parental species is $2n = 42$. This evidence strongly supports the assumption that these species are distinct.

Bromus willdenowii Kunth (*Ceratochloa unioloides* (Willd.) Beauv.)	*B. unioloides* Kunth (*Ceratochloa haenkeana* Presl)
Glumes glabrous or slightly scabrid on nerves;	Glumes uniformly scabrid on the whole surface;
Lemma 14-20 mm long, 11-13-nerved, more or less scabrid on the back, with more prominent scabridulae on the nerves;	Lemma 9-13 mm long, 7-9 (11)-nerved, uniformly scabrid on the whole surface;
Awn of the lemma absent or up to 3 mm long;	Awn of the lemma more than 3 mm long;
Ligule hairy.	Ligule glabrous.

Bromus carinatus is naturalized and established in many places in this country, e.g. Salisbury (Wilts.), near the Thames at Kew (Surrey), Brentford and Chiswick (Middlesex), Oxford, Maulden (Bedford), etc. Two specimens at B.M. originally named *B. carinatus* proved to be *B. marginatus*. The new records are: Rickmansworth Aquadrome (Herts), J. G. Dony, 1961; and Edinburgh, J. Fraser, 1906.

B. marginatus is characterized by having leaf-sheaths strongly retroversely long-hairy, a rather contracted panicle with short, erect branches, and densely hairy lemmas with a short awn less than 7 mm long. In *B. carinatus* the leaf-sheaths are scabrous to rather sparsely pilose, the panicle with fairly long, spreading or drooping branches, and the lemmas are minutely appressed-pubescent to glabrous, with an awn 7-15 mm long.

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—A. MELDERIS

PLANT RECORDS

Compiled by E. C. WALLACE

'Plant Records' are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1967.

The following signs are used:—

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora.*

† before the *L.B.V.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice-county record, not published previously to this issue of the *Proceedings.* Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora.*

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora,* but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§ 4/4. Equisetum variegatum Schleich, ex Weber & Mohr. ‡**9,** Dorset; near Ower, 1966, Miss C. E. Ollivent (1967, *Proc. Dorset. nat. Hist. archaeol. Soc.,* **88,** 44). **94,** Banff; by the Builg burn 2 miles south of Inchory Lodge, Tomintoul, M. McC. Webster.

§ 4/8. Equisetum pratense Ehrh. ***97,** Westerness; north-east facing rock angle in cliff, Coire a' Mhusgain, Mamore Forest, *c.* 2,000 ft., H. Milne-Redhead.

15/6. Asplenium viride Huds. **94,** Banff; calcareous rocks in the gorge of Water of Ailnach; abundant in limestone rocks south of Inchory Lodge, Tomintoul, M. McC. Webster.

§ 16/1. Ceterach officinarum DC. ***29,** (Herts); several plants on a wall, Royston Station, J. E. Raven, comm. F. H. Perring.

19/3. Cystopteris montana (Lam.) Desv. The record given for v.c. **88** (1967 *Proc. bot. Soc. Br. Isl.,* **7,** 27) was an error.—**Ed.**

21/1 × 2. Dryopteris × tavelii Rothm. **49,** Caern.; two large plants in a wood with both parents near Bangor, R. H. Roberts (1968, *Nature Wales,* **11,** 31). **52,** Anglesey; one plant in a wood near Llangefni, also in a wood at Llanddyfnan, R. H. Roberts (1968, *Nature Wales,* **11,** 32).

§ 21/3. Dryopteris abbreviata (DC.) Newm. ‡**47,** Montg.; beside road northwest of Llangynog near Lake Vyrnwy, 1966, H. V. Corley (1968, *Nature Wales,* **11,** 31).

§ 21/9. Dryopteris assimilis S. Walker. ‡**86,** Stirling; Ben Lomond, 1932, R. Mackechnie: ‡**92,** S. Aberdeen; Cairn Toul, 1934, E. C. Wallace & R. Mackechnie: ‡**96,** Easterness; Carn Eige, Glen Cannich, E. C. Wallace: **97,** Westerness; Ben Alder, 1946, R. Mackechnie: **98,** Argyll; Beinn Mhor, Loch Eck, E. C. Wallace; Bidean nam Bian, Glencoe, 1949, E. C. Wallace & R.

MACKECHNIE: ‡**105,** W. Ross; Meall & Chrasgaidh, Fannich Forest, 1948, E. C. WALLACE & R. MACKECHNIE, all det. A. C. JERMY (1967, *Glasg. Nat.*, **18,** 519-520).

22/2. POLYSTICHUM ACULEATUM (L.) Roth. **55,** Leics.; Castle Hill, Withcote, 1945, T. G. TUTIN, E. K. HORWOOD, 1955; old quarry near Cocklow Wood, east side of Buddon Wood, 1962, E. K. HORWOOD; in deep shade, The Brand, Woodhouse Eaves, G. HALLIDAY.

22/3. POLYSTICHUM LONCHITIS (L.) Roth. **94,** Banff; calcareous rock in the gorge of Water of Ailnach; abundant on limestone scree south of Inchory Lodge, Tomintoul, M. McC. WEBSTER.

28/1. BOTRYCHIUM LUNARIA (L.) Sw. **H.16,** W. Galway; short turf in meadow, Inishnee Island, Roundstone, E. BOOTH, comm. M. McC. WEBSTER.

61/1. GLAUCIUM FLAVUM Crantz. **71,** Man; several plants in hollows of gravel (simulating a shingle-beach) over a mile from nearest coast, Kimmeragh quarries, Bride, D. E. ALLEN & M. DEVEREAU.

80/2. CORONOPUS DIDYMUS (L.) Sm. **95,** Moray; garden weed, Innes House, Urquhart, M. McC. WEBSTER.

88/5. COCHLEARIA DANICA L. **95,** Moray; below cottage wall, Hopeman harbour, rare, M. McC. WEBSTER.

94/3. DRABA INCANA L. **94,** Banff; limestone escarpment 11 miles south of Inchory Lodge; shingle of river Avon, Tomintoul, M. McC. WEBSTER.

§ 97/3. CARDAMINE IMPATIENS L. ‡**43,** Radnor: in a steep shady wood near Llanbadarn y Garreg, about 3 miles upstream from Aberedw Rocks, specimens were collected by A. E. Wade in 1927, on a tributary of the Edw, Miss A. C. POWELL (1968, *Nature Wales*, **11,** 30).

§†98/4. BARBAREA VERNA (Mill.) Aschers. ***71,** Man; Ramsey Dump, one plant, D. E. ALLEN, M. DEVEREAU & L. S. GARRAD.

§ 100/4. ARABIS HIRSUTA (L.) Scop. ***20,** Herts; railway cutting in chalk near Bygrave, R. M. BURTON.

102/3. RORIPPA SYLVESTRIS (L.) Bess. **95,** Moray; garden weed, Cotherton Cottage, Brodie; garden weed, Logie House, M. McC. WEBSTER.

§ 112/2. RESEDA LUTEA L. ‡†**46,** Card.; waste ground near railway sidings between Plascrug crossing and Aberystwyth, Miss A. P. CONOLLY & D. P. SPICER (1968. *Nature Wales*, **11,** 31).

123/6. SILENE GALLICA L. var. ANGLICA (L.) Clapham. **71,** Man; cornfield by Silverburn, north of Castletown, first record since 1923, L. S. GARRAD, comm. D. E. ALLAN.

†125/1. AGROSTEMMA GITHAGO L. **71,** Man; with *Centaurea cyanus* in a field at Ballaterson, Maughold, introduced with continental seed, 1966, G. E. QUAYLE, comm. D. E. ALLEN.

§ 137/1. MINUARTIA VERNA (L.) Hiern. ‡**75,** Ayr; on serpentine grassland on the landward side of Byrne Hill, near Girvan, 1964, H. A. MCALLISTER, conf. at ROY. BOT. GARDENS, KEW (1967, *Glasg. Nat.*, **18,** 520).

§ 157/1. HALIMIONE PORTULACOIDES (L.) Aellen. ***71,** Man; two plants in muddy gully, Langness Point, M. DEVEREAU, comm. D. E. ALLEN.

† 159/2. SALSOLA KALI L. subsp. RUTHENICA (Iljin) Soó (*S. pestifer* A. Nels.). **90,** Forfar; carrot field, *c.* ½ mile west of Gallery, near Montrose, U. K. DUNCAN, det. D. MCCLINTOCK (as *S. kali* var. *tenuifolia*).

169/4. ERODIUM CICUTARIUM (L.) L'Hérit. subsp. BIPINNATUM (Willd.) Tourlet (*E. glutinosum* Dumort.) **103,** Mid Ebudes; sand dunes, east side of Feall Bay, Isle of Coll, C.S.S.F. FIELD MEETING, conf. at ROY. BOT. GARDEN, EDINBURGH, comm. U. K. DUNCAN as *E. glutinosum.*

† 171/4. IMPATIENS GLANDULIFERA Royle. **71,** Man; along Laxey stream near the woollen mills, for about 50 yards—first record for a stream in Man, M. DEVEREAU, comm. D. E. ALLEN.

187/1 × 2. ULEX EUROPAEUS × GALLII. **45,** Pemb.; a number of plants in a disused quarry near Goodwick, in full flower on 26 November 1966, T. A. W. DAVIS, conf. P. M. BENOIT; frequent on cliff slopes between Newgate and Cwmbach, some still with flowers on 14 January 1967 when the associated *U. gallii* was quite over; one plant on a cliff slope above Porthlysgi, St. Davids, T. A. W. DAVIS (1968, *Nature Wales*, **11,** 31).

§†191/2. MELILOTUS OFFICINALIS (L.) Pall. ***71,** Man; waste ground, Ramsey, 1965 M. BRIGGS; 1967, D. E. ALLEN.

§ 206/2. VICIA TETRASPERMA (L.) Schreb. **71,** Man; near Castletown, L. S. GARRAD, conf. and comm. D. E. ALLEN.

206/9. VICIA OROBUS DC. **77,** Lanark; near Falls of Clyde, a single plant, 1965, W. A. SCOTT (1967, *Glasg. Nat.*, **18,** 521).

220/3 (2). ALCHEMILLA FILICAULIS Buser subsp. VESTITA (Buser) M. E. BRADSHAW. **3,** S. Devon; about 40 plants on banks of South Teign near Leigh Bridge; roadside above Teigncombe, 2 plants; Chagford, R. J. SKERRETT.

220/3 (8). ALCHEMILLA XANTHOCHLORA Rothm. **3,** S. Devon; a small patch formerly grew in a field near the Rectory, Chagford, but is now apparently extinct, R. J. SKERRETT.

§†220/3 (t). ALCHEMILLA TYTTHANTHA Juz. **‡81,** Berwick; near Duns (1967, *Glasg. Nat.*, **18,** 521). **‡86,** Stirling; in considerable quantity on a railway bank near Campsie, 1965, R. MACKECHNIE, D. MCCLINTOCK & A. MCG. STIRLING, det. S. M. WALTERS (1967, *Glasg. Nat.*, **18,** 521).

§†222/2. SANGUISORBA CANADENSIS L. **‡76,** Renfrew; in small quantity in a thicket on marshy ground at the edge of Castle Semple Loch, 1965, J. M. LENNIE (1967, *Glasg. Nat.*, **18,** 522).

† 224/i. ACAENA INERMIS Hook. f. **3,** S. Devon; patch by Batworthy Brook, Chagford Common, R. J. SKERRETT.

225/11. ROSA TOMENTOSA Sm. **71,** Man; lane above South Cape, Laxey, 1968; lane by Silverburn, east of Grenaby, 1960, D. E. ALLEN, det. R. MELVILLE.

§ 226/6. PRUNUS PADUS L. **71,** Man; all previous records appear to be errors for *P. cerasus*, which has proved to be extensively naturalised in the wildest parts of the northern Curraghs; delete v.c. **71** from *C.F.*, D. E. ALLEN.

†235/3. SEDUM SPURIUM Bieb. **52,** Anglesey; old wall top, near cottages, Glanafon, R. M. BURTON.

239/15. SAXIFRAGA HYPNOIDES L. **94,** Banff: gorge of the Water of Ailnach, *c.*2 miles from Belnabo, rare, M. MCC. WEBSTER.

†271/1. ASTRANTIA MAJOR L. **76,** Renfrew; a well-established colony on the roadside at Kennishead, 1966, A. D. CHISHOLM (1967, *Glasg. Nat.*, **18,** 522).

†279/1. CORIANDRUM SATIVUM L. ***71,** Man; Ramsey Dump, D. E. ALLEN, M. DEVEREAU & L. S. GARRAD.

285/1. APIUM GRAVEOLENS L. **52,** Anglesey; Llanog, Llangoed, on muddy rubble near the sea, R. M. BURTON.

304/1. MEUM ATHAMANTICUM Jacq. **94,** Banff; scattered in alpine meadow, Inchory Lodge, Tomintoul, G. SHEPHERD, comm. M. McC. WEBSTER.

320/5. POLYGONUM VIVIPARUM L. **72,** Dumfries; damp flush with *Juncus* spp., east side of Tomleuchar Burn, Eskdalemuir, 850 ft., R. W. M. CORNER, comm. H. MILNE-REDHEAD.

§ 355/1. ARCTOUS ALPINUS (L.) Nied. ‡**98,** Argyll; Meal a' Bhuiridh, Glencoe ,altitude 1,800 ft., 1966; the most southern locality recorded for Britain, A. G. KENNETH, P. MCPHERSON & A. MCG. STIRLING (1967, *Glasg. Nat.*, **18,** 523).

372/4. ANAGALLIS MINIMA (L.) E. H. L. Krause. **71,** Man; very abundant for about 100 yards along a wet lane near Mount Murray, D. E. ALLEN & M. DEVEREAU.

385/3. GENTIANELLA AMARELLA (L.) Börner *s.l.* **94,** Banff; by the Builgburn, Inchory Lodge, Tomintoul, M. McC. WEBSTER.

§†392/7. SYMPHYTUM GRANDIFLORUM DC. ***33,** E. Glos.; naturalised and well established along the sides of a farm track from Hen Hill to South Farm, Charlton Kings, Cheltenham, W. J. NEVE, det. A. E. WADE (1968, *J. North Glos. Nat. Soc.*, **19,** 317).

†406/p. CALYSTEGIA PULCHRA Brummitt & Heywood. **3,** S. Devon; thicket in disused part of limestone quarry, Drewsteignton, R. J. SKERRETT.

430/10. VERONICA FRUTICANS Jacq. **87,** W. Perth; on a small exposure of metamorphic 'sugar' limestone on Beinn Dubhcraig, 1966, S. MITCHELL; this confirms the record 'rocks above Loch Oss' (Buchan White, 1898, *Flora of Perthshire*, 231, subsequently recorded by J. R. Lee, 1933, *Flora of the Clyde Area*, 242), (1967, *Glasg. Nat.*, **18,** 523).

†430/14. VERONICA PEREGRINA L. **73,** Kirkcudbright; garden weed, Corbieton, Castle Douglas, 200 ft., E. I. BIGGAR, comm. H. MILNE-REDHEAD.

435/1(19). EUPHRASIA ROSTKOVIANA Hayne, **34,** W. Glos.; a large colony in a field in Flaxley Valley, C. W. BANNISTER, comm. D. E. de VESIAN.

437/1. PARENTUCELLIA VISCOSA (L.) Caruel. †**71,** Man; abundant in two fields in Sulby Curraghs, D. E. ALLEN.

453/1. CLINOPODIUM VULGARE L. **95,** Moray; a single plant by river Findhorn, Greshop Wood, Forres, M. McC. WEBSTER.

470/2. TEUCRIUM SCORDIUM L. **29,** Cambs.; twenty plants, some of them juvenile, on bare mud in a dry cutting across ditch at Bassenhally Pits. This is one of the only two stations in Cambridgeshire where the species is still extant; formerly it occurred in several others, F. H. PERRING.

488/3. VIBURNUM OPULUS L. **95,** Moray; roadside south of Altyre House, Forres; plentiful in wood, Whitemire, M. McC. WEBSTER.

†491/1. LONICERA XYLOSTEUM L. **94,** Banff; naturalised in the woods at Duff House, Banff, M. McC. WEBSTER.

†492/1. LEYCESTERIA FORMOSA Wall. **83,** Edinb.; three plants amongst rank vegetation, grounds of Carberry Tower, Musselburgh, R. J. SKERRETT.

506/1 × 2. SENECIO × OSTENFELDII Druce. **106,** E. Ross; marsh, north-west side of Loch Garve: **107,** E. Sutherland; marsh by roadside, near Rosehall, Altassmore, U. K. DUNCAN, conf. at ROY. BOT. GARDEN, EDINBURGH.

†506/4. SENECIO SQUALIDUS L. **90,** Forfar; railway sidings, Forfar, M. McC. WEBSTER.

†544/10. CENTAUREA SOLSTITIALIS L. **90,** Forfar; carrot field, *c.* $\frac{1}{2}$ mile west of Gallery, near Montrose, U. K. DUNCAN.

545/1. SERRATULA TINCTORIA L. **3,** S. Devon; two plants on rock ledge, Fur Tor, Dartmoor at 1,865 ft.; Clapham, Tutin & Warburg, 1962, *Flora of the British Isles* give 1,250 ft. as altitude limit, R. J. SKERRETT.

§ 554/1. LACTUCA SERRIOLA L. **†90,** Forfar; carrot field, *c.* ½ mile west of Gallery, near Montrose, U. K. DUNCAN.

§ 554/2. LACTUCA VIROSA L. ***†90,** Forfar; carrot field, *c.* ½ mile west of Gallery, near Montrose, U. K. DUNCAN.

558/2(9). PILOSELLA PRAEALTA (Vill. ex Gochnat) C. H. & F. W. Schultz (*Hieracium praealtum* Vill. ex Gochnat). **43,** Radnor; on a wall at Knucklas, J. R. PALMER, det. C. WEST. Dr West states that this is a considerable extension of the known range (1968, *Nature Wales*, **11,** 30).

§†571/1. LAGAROSIPHON MAJOR (Ridl.) Moss. ***33,** E. Glos.; gravel pits at South Cerney and Pool Keynes, Mrs S. C. HOLLAND, det. at ROY. BOT. GARDENS, KEW, comm. D. E. de VESIAN.

§ 577/12. POTAMOGETON RUTILUS Wolfg. ***106,** E. Ross; Loch Eye, near Lochslin, U. K. DUNCAN, det. J. E. DANDY & SIR GEORGE TAYLOR. New to the mainland, U. K. DUNCAN.

598/1. ORNITHOGALUM UMBELLATUM L. **†76,** Renfrew; established on the north side of the old road from Bishopton to Greenock, Miss A. LAIRD (1967, *Glasg. Nat.*, **18,** 523).

§ 605/4. JUNCUS COMPRESSUS Jacq. ***90,** Forfar; damp ground by drain, Fairmuir Goods Station, Dundee, U. K. DUNCAN.

605/7b. JUNCUS BUFONIUS L. subsp. FOLIOSUS (Desf.) Maire & Weiller. **71,** Man; marsh near Bulgham Bay; streamside Port Lewaigue, alongside subsp. *bufonius*, in neither case really typical, D. E. ALLEN.

§ 605/15. JUNCUS ACUTUS L. ***1,** W. Cornwall; locally frequent in damp sand, south-west corner of Harbour Cove, near inflow stream, Padstow, G. HALLIDAY.

607/3. ALLIUM SCORODOPRASUM L. **74,** Wigton; rough ground near shore, Port Castle Bay, H. MILNE-REDHEAD.

607/8. ALLIUM SCHOENOPRASUM L. **99,** Dunbarton; on rocks near water level, Fraoch Eilean, Loch Lomond, P. MACPHERSON.

§ 625/4. EPIPACTIS LEPTOCHILA (Godfery) Godfery. ***65,** N.-W. York; under trees and bushes on limestone river shingle, Easby, C. M. ROB: Richmond, Mrs J. HOLLOWAY, both det. D. P. YOUNG; Miss Rob has known it at the former station for over 20 years, D. P. YOUNG.

§ 649/1. ARUM MACULATUM L. ***†96,** Easterness; tunnel running to railway line in a small wood, Clunes, Kirkhill, M. McC. WEBSTER.

§ 651/1. WOLFFIA ARRHIZA Hork. ex Wimm. **34,** W. Glos.; the record given in *Proc. bot. Soc. Br. Isl.*, **7,** 32 (1968) was an error, D. E. de VESIAN. Delete from *C.F.*—**Ed.**

§ 663/23. CAREX STRIGOSA Huds. **21,** Middx.; Old Park Wood, Harefield, F. ROSE & P. MOXEY; first record since *c.* 1887, D. H. KENT. ***45,** Pemb.; a small colony by a moist woodland track, Nevern, T. A. W. DAVIS, det. A. C. JERMY.

§ 663/24. CAREX PALLESCENS L. ***49,** Caern.; damp gully in cliffs, near Devil's Kitchen, Cwm Idwal, R. M. BURTON.

§†676/15. POA CHAIXII Vill. ***96,** Easterness; policies of Auchnagairn House, Kirkhill, M. McC. WEBSTER.

638/3. BROMUS BENEKENII (Lange) Trimen. **33,** E. Glos.; Popes Wood, near Painswick, 1932; **34,** W. Glos.; above river Wye at English Bickner, 1946, E. MILNE-REDHEAD, comm. D. E. de VESIAN.

§ 686/1. ELYMUS ARENARIUS L. ***73,** Kirkcudbr.; Roredune, Mersehead Sands, South wick, H. MILNE-REDHEAD.

700/1. CALAMAGROSTIS EPIGEJOS (L.) Roth. **71,** Man; large patch on clay-capped headland, Port Soderick, L. S. GARRAD; the only previous Manx record is over a century old, D. E. ALLEN.

†701/7. AGROSTIS SCABRA Willd. **17,** Surrey; abundant on railway tracks over a wide area, Nine Elms goods yard, Battersea, 1966, Lady ANNE BREWIS, R. CLARKE, E. J. CLEMENT & D. P. YOUNG, det. C. E. HUBBARD.

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

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SYNOPSIS

	Page
Systematic, etc.	401
Topographical	457
Floras, Catalogues, etc.	464
Ecological (See also Topographical)	467
Phytogeographical and Phytosociological and Floristic Studies	470
Chromosome Surveys	479
Historical	480
Biographical	482
Obituaries	483
Palaeobotany	484
Herbarium, Laboratory, Recording techniques, etc.	485
Classification, Nomenclature and Botanical Terminology	486
Miscellaneous	490

SYSTEMATIC, ETC.

1.→ PTERIDOPHYTA. Kiefer, L. L. & Joe, B., 1967, Check list of Californian Pteridophyta, *Madroño*, **19**, 65-73. An annotated list of the Pteridophyta recorded from California, which includes many species which occur also in Britain.—[D.H.K.]

1.→ PTERIDOPHYTA. Kunkel, G., 1967, *Helechos Cultivados. Descripción illustrada de* 40 *especies cultivadas en las Islas Canarias. Ediciones del Excmo Cabildo Insular de Gran Canaria. IV. Ciencias.* Pp. 175 + 43 photographs. Las Palmas. Descriptions are given of 40 species of ferns and fern allies cultivated in the Canary Islands. These are arranged under genera with a key to the identification of the species. Descriptions, synonymy and photographs of the various species, many of which are native in the British Isles, are given.—[D.H.K.]

1.→ PTERIDOPHYTA. Kunkel, G., 1967, On the pteridophytes of La Gomera (Canary Islands), *Cuad. Bot.*, **2**, 29-41. An enumeration of the 31 species of the pteridophyta known to grow at La Gomera, Canary Islands, with descriptions and taxonomic notes; attention is drawn also to various other species which may yet be found in the area. *Dryopteris* c.f. *dilatata* is new to the islands, and *Asplenium onopteris* var. *triangularis*, var. nov., is described.—[D.H.K.]

1.→ PTERIDOPHYTA. Poirion, L., Bono, G. & Barbero, M., 1967, Pteridophytes de la Côte d'Azur, des Préalpes Chaîne des Alpes Maritimes, *Webbia*, **22**, 21-37. Notes on the pteridophytes of the Côte d'Azur and adjacent regions. Three species are recorded as new to the area, viz. *Isoetes velata* R. Br., in small puddles at Esterel and Maures; *Ophioglossum azoricum*, a species chiefly confined to western France, now found in "La Colle du Rouet" (Estere) and *Diphasium* *alpinum* (*Lycopodium alpinum*), new to the Ligurian Alps in the Peslo Valley. The region is very rich in pteridophytes, no less than 64 different species having been recorded there.—[D.H.K.]

1.→ PTERIDOPHYTA. Wagner, W. H. & Wagner, F. S., 1966, Pteridophytes of the Mountain Lake Area, Giles Co., Virginia: biosystematic studies, 1964-65, *Castanea*, **31,** 121-140. Notes on Virginian pteridophytes, including *Ophioglossum vulgatum*, *Dryopteris* spp., *Asplenium trichomanes* and *Polypodium* spp.—[D.H.K.].

1.→ LYCOPODIACEAE. Corner, R. W. M., 1967, Lycopodium species on colliery debris in southern Scotland, *Trans. Proc. bot. Soc. Edinb*, **40,** 337-338.

1. DIPHASIUM (LYCOPODIUM p.p.). Kukkonen, I., 1967, Studies on the variability of Diphasium (Lycopodium) complanatum, *Annls. Bot. Fenn.*, **4,** 441-470. The taxonomy and distribution of the extremely variable species *Diphasium complanatum* are discussed.—[D.H.K.]

2. SELAGINELLA. Webster, T. R., 1967, Induction of Selaginella sporelings under greenhouse and field conditions, *Am. Fern J.*, **57,** 161-166. Experimental studies, mostly involving *S. kraussiana*.—[D.H.K.]

2/2. SELAGINELLA KRAUSSIANA (Kunze) A. Braun. Kunkel, G., 1967, Selaginella kraussiana A. Br. en Canarias, *Cuad. Bot.*, **2,** 21-22. Notes on the occurrence of *Selaginella kraussiana* in the Canary Islands.—[D.H.K.]

3/2. ISOETES SETACEA Lam. (*I. echinospora* Durieu). Welten, M., 1967, Ein Brachserkraut, Isoetes setacea Lam. Fossil im schweizerischen Molasseland: Diskussions beitrag zu den Begriffen des Areals und des historischen Elementes, *Bot. Jb.*, **86,** 527-536. Fossil microspores of *Isoetes setacea* are recorded from south-west of Bern, Switzerland, in the tertiary zone between the Alps and the Jura. Comparisons are made between the pre-glacial distribution and the present scattered relict distribution of the species in Europe.—[D.H.K.]

4. EQUISETUM. Hauke, R. L., 1966, Preliminary reports on the flora of Wisconsin no. 54. Equisetaceae—Horsetail Family, *Trans. Wis. Acad. Sci. Arts Lett.*, **54,** 331-346.

4/3 × 4. EQUISETUM RAMOSISSIMUM Desf. × E. VARIEGATUM Schleich. ex Weber. Kauffmann, G., 1967, Nuove Stazioni ticinesi di Equisetum ramosissimum × variegatum [= Equisetum meridionale (Milde) Chiovenda, E. variegatum Schleicher var. meridionale Milde, E. naegelianum W. Koch], *Bauhinia*, **3,** 153-159. A description is given of the rare hybrid *Equisetum ramosissimum* × *variegatum*, recently discovered at Tessin, Switzerland. Other known records of the hybrid in Europe are reviewed and its nomenclature is discussed.—[D.H.K.]

4/6. EQUISETUM PALUSTRE L. Chwastek, M., 1966, Methods of marsh horsetail (Equisetum palustre L.) control, and its regenerative abilities, *Wiad. Inst. Melior. Uzyt. Zielonych*, **6,** 157-169. Control measures recommended for the eradication of *Equisetum palustre* are the complete crushing of its roots when reclaiming drained marshland prior to establishing sown meadowland, and the frequent use of fertilizers so that the growth of grass suppresses the re-establishment of the species.—[D.H.K.]

4/8. EQUISETUM ARVENSE L. Page, C. N., 1964, Sporelings of Equisetum arvense in the wild, *Br. Fern Gaz.*, **9,** 335-338. The recorded occurrences of *Equisetum* prothalli are very few, thus the occurrence of young plants at Whittle Dene Reservoirs, *c.* 10 miles west of Newcastle upon Tyne provided a unique opportunity for studying this process. A full account of this interesting colony and of the habitat in which it occurred is given.—[D.H.K.]

5.→ PTEROPSIDA. Borel, A., 1968, Les fougères de la région de Saint-Etienne-de-Tinée (Alpes-Maritimes), *Monde des Plantes*, **358,** 4-7. Notes on the ferns occurring in the Saint-Etienne-de-Tinée district of the Alpes-Maritimes, France.—[D.H.K.]

5.→ PTEROPSIDA. Buckley, A. R., 1967, Hardy Ferns, *Gdnrs' Chron.*, **162**, (14), 14. Among hardy ferns recommended for garden culture are *Osmunda regalis, Onoclea sensibilis, Matteucia struthiopteris, Athyrium filix-femina, Ceterach officinarum, Asplenium trichomanes, A. viride, Polystichum aculeatum* and *Dryopteris carthusiana*.—[D.H.K.]

5.→ PTEROPSIDA. Kempf, C., 1967, Fougères d'Alsace, *Inf. Ann. Caryosyt. Cytogen.*, **1**, 15-16. Chromosome numbers given for ferns from Alsace include *Blechnum spicant*, $n = 34$; *Osmunda regalis*, $n = 22$; *Phyllitis scolopendrium*, $n = 36$; *Asplenium ruta-muraria*, $n = 72$; *A. trichomanes*, $n = 81$; *Polypodium vulgare*, $n = 37$ and 74; *Thelypteris limbosperma*, $n = 34$; *Athyrium filix-femina*, $n = 50$.—[D.H.K.]

5.→ PTEROPSIDA. Lebrun, J.-P., 1966, Les ptéridophytes dans la région parisienne, 24-25. Cystopteris fragilis et Blechnum spicant, *Cah. Nat.*, **22**, 103-110. The distribution of *Cystopteris fragilis and Blechnum spicant* in the Parisian area is given in detail, illustrated by maps. Some comments are made on their taxonomy.—[E.B.B.]

5.→ PTEROPSIDA. Morton, C. V., 1967, Studies of fern types, 1, *Contr. U.S. natn. Herb.*, **38**, 29-83.

5.→PTEROPSIDA. Papp, C., 1964, Subunitati noi de Polypodiaceae, *Comm. Bot.* **4**, 97-99. *Athyrium filix-femina* var. *multidentatum* f. *laxissima*, f. nov., f. *pectinato-dentata*, f. nov., subforma *laxa*, subf. nov. and subforma *imbricata*, subf. nov. and *Phegopteris dryopteris* var. *disjuncta* f. *longistipa*, f. nov., are described from România.—[D.H.K.]

5. OSMUNDA. Bobrov, A. E., 1966, Morfologija spor semejstva Osmundaceae, *Bot. Zurn.*, **51**, 1452-1460. Studies on the spore morphology of *Osmunda*.—[D.H.K.]

5/1. OSMUNDA REGALIS L. Westhoff, V. & Reinink, K., 1967, Osmunda regalis L. op Terschelling, oecologisch en vegetatiekundig bezien, *Gorteria*, **3**, 204-209. Ecological and phytosociological notes on *Osmunda regalis* on the Dutch island of Terschelling. The island consists mainly of dunes and is deficient in lime. The species has been known there from a single locality on the bank of a ditch at the innermost dune border since 1886. The associated vegetation is analysed and it is concluded that adjacent wood plantations of *Pinus nigra, Alnus glutinosa* and *Prunus serotina*, planted in 1951 and 1959-60 appear to have induced *O. regalis* to spread. The open habitat is more closely related to the Irish ones than to the more sheltered and shady habitats of south and subatlantic Europe. The nutrition level of the subsoil is very poor, and in this respect the habitat is, however, more comparable with those on the Dutch mainland than with the Irish and the southern and subatlantic European ones.—[D.H.K.]

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Braid, K. W., 1967, Bracken (Pteridium aquilinum) sporeling regeneration in West Sutherland, *Glasg. Nat.*, **19**, 518. In Scotland under normal acid conditions bracken sporelings are rare, and data is provided on three tiny colonies on a recently exposed cutting on the road from Bettyhill to Borgie Bridge in 1963. It is considered that at least two of these colonies had originated from sporelings.—[D.H.K.]

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Davis, B. D., 1968, Effect of light quality on the transition to two-dimensional growth by gametophytes of Pteridium aquilinum, *Bull. Torrey bot. Club*, **95**, 31-36.

8/1. PTERIDIUM AQUILINUM (L.) Kuhn. Oinonen, E., 1967, Sporal regeneration of bracken (Pteridium aquilinum (L.) Kuhn) in Finland in the light of the dimensions and the age of its clones, *Acta for. fenn.*, **83** (1), 1-96.

8/1. Pteridium aquilinum (L.) Kuhn. Oinonen, E., 1967, The correlation between the size of Finnish bracken (Pteridium aquilinum) clones and certain periods of site history, *Acta for. fenn.*, **83** (2), 1-51.

8/1. Pteridium aquilinum (L.) Kuhn. Simmonds, F. J., 1967, Possibilities of biological control of bracken, Pteridium aquilinum (L.) Kuhn (Polypodiaceae), *PANS*, **13**, 200-203. Insect species known to attack *Pteridium aquilinum* in Europe are listed with brief notes on their effects on the plant. It is emphasised that although these insects contribute very little to the control of bracken in Europe their introduction into extra-European areas where bracken occurs may be considered worthwhile on an experimental basis.—[D.H.K.]

11. Adiantum. Nayar, B. K. & Devi, S., 1967, Spore morphology of the Pteridaceae, 2. The gymnogrammoid ferns, *Grana Palynol.*, **7**, 568-600. Studies on the spore morphology of a number of fern genera, including *Adiantum.*—[D.H.K.]

11/1. Adiantum capillus-veneris L. Williams, S. L., 1967, Variation in Adiantum in the British Isles, *Br. Fern Gaz.*, **9**, 350-352. A review of the natural habitats and distribution of *Adiantum capillus-veneris* in the British Isles is given, and attention is drawn to the inland records of the species originating from spores of cultivated plants. The species particularly favours supporting walls and footings in old greenhouses, and a number of records are given, chiefly from the London area. E. J. Lowe raised a number of cultivars, and it is possible that some of these occur as sporelings in the habitats mentioned. In this different environment changes occur in the size of fronds and in the pinnules, while plants growing in adverse conditions are often stunted in appearance. A list is given of 'cultivars' originally found in the 'wild', mostly from Devon and Ireland, and a further list of forms raised in cultivation is also provided. Although the author has raised several hundred plants from spores of the typical form he has not so far obtained a variant.—[D.H.K.]

14/1. Phyllitis scolopendrium (L.) Newm. Dalby, D. H., 1966, Mosses and ferns in Kent's Cavern, *Trans. Proc. Torquay nat. Hist. Soc.*, **14**, 118-123. The only fern noted in Kent's Cavern, a cave system at Torquay, was *Phyllitis scolopendrium.* The species was restricted to the vicinity of the electric lighting, and was very conspicuous, growing exceedingly close to some of the lights and partially obscuring them. Numerous sporelings showed that the plants were regenerating efficiently in their semi-artificial habitat. It was noted that in the deeper parts of the cave system the fronds were more delicate and of a lighter green than in plants growing in open habitats.—[D.H.K.]

15. Asplenium. Damboldt, J., 1964, Ein Beitrag zur Kenntnis von Asplenium trichomanes L. em. Huds. in Bayern, *Ber. bayer. bot. Ges.*, **37**, 5-9. A cytotaxonomical study of *Asplenium trichomanes* in Bavaria has revealed the presence of subsp. *bivalens* D. E. Meyer, subsp. *quadrivalens* D. E. Meyer em. Lovis, and the hybrid *A.* × *germanicum.* The distributions of the various taxa are illustrated by a map.—[D.H.K.]

15. Asplenium. Lovis, J. D. and Reichstein, T., 1968, Über das spontane Entstehen von Asplenium adulterinum aus einem naturlichen Bastard, *Naturwissenschaften*, **55**, 117-120.

15. Asplenium. Martinez, S. Rivas-, 1967, Une espéce nouvelle d'Asplenium (Aspleniaceae) d'Espagne, *Bull. Jord. Bot. Nat. Belg.*, **37**, 329-344. *Asplenium celtibericum* Rivas-Martinez, sp. nov., is described and figured from Spain, and details are provided of its known distribution.—[D.H.K.]

15. Asplenium. Mergenthaler, O., 1964, Neufunde von Serpentinfarnen in der mittleren Oberpatz, *Ber. bayer. bot. Ges.* **37**, 108-109. Notes on recent discoveries

of ferns in the serpentine areas of the Bavarian Alps, including a number of subspecies of *Asplenium* species.—[D.H.K.]

15. ASPLENIUM. Morlang, C., Junr., 1967, Hybridization, polyploidy and adventitious growth in the genus Asplenium, *Am. J. Bot.*, **54**, 887-897. Studies on American species of *Asplenium*.—[D.H.K.]

16. CETERACH. Benl, G. & Kunkel, G., 1967, Zur Taxonomie der Gattung Ceterach auf den Kanarischen Inseln, *Ber. schweiz. bot. Ges.*, **77**, 257-265. A revision of the genus *Ceterach* in the Canary Islands shows that the taxa present are *C. aureum* (Cav.) Bueh. var. *aureum*, and var. *parvifolium* Benl et Kunkel, var. nov. Hitherto, the latter variety had been confused with *C. officinarum*.—[D.H.K.]

18/1. ATHYRIUM FILIX-FEMINA (L.) Roth. Schüepp, O., 1967, Beschreibung eines Farnwedels, 1. Primär blätter von Athyrium filix-femina, *Bauhinia*, **3**, 133-146.

20/1. WOODSIA ILVENSIS (L.) R. Br. Pohorelý, v., 1966, Woodsia ilvensis (L.) R. Br. na Decínsku, *Zprávy Cesk. Bot. Spolecn. CSAV*, **1**, 172-173.

21. DRYOPTERIS. Widén, C. J., Sarvela, J. & Ahti, T., 1967, The Dryopteris spinulosa complex in Finland, *Acta bot. fenn.*, **77**. Pp. 24. A comparative morphological study was carried out on Finnish material of *Dryopteris assimilis*, *D. dilatata* and *D. carthusiana* (*D. spinulosa*). It was found that *D. assimilis* is common and widespread in the country, while *D. dilatata* is rare, being confined to the extreme south-west. *D. carthusiana* is much more widespread in northern Finland than reported earlier, extending into Lapland. The following putative hybrids are reported from the country, *D. carthusiana* × *dilatata*, *D. assimilis* × *dilatata* and *D. assimilis* × *carthusiana*.—[D.H.K.]

21/a. DRYOPTERIS ASSIMILIS S. Walker. McAllister, H. A., 1967, Dryopteris assimilis S. Walker on Beinn Narnain, *Glasg. Nat.*, **18**, 5-19. The discovery of *Dryopteris assimilis* on Beinn Narnain, Argyll, in 1961 is reported, and notes are provided on its morphological differences from *D. dilatata*.—[D.H.K.]

21/a. DRYOPTERIS ASSIMILIS S. Walker. Roberts, R. H., 1968, Further records of the Dwarf Buckler Fern in Wales, *Nature Wales*, **11**, 29. A summary of the distribution of *Dryopteris assimilis* in Wales since it was first recorded from Caernarvonshire in 1965 is given. It is now known in several additional localities in Snowdonia, and plants which may be referable to the species have been collected in Merioneth and Anglesey. Notes are provided on the habitats of the species, and on the associated plants with which it usually grows. Details of morphological variation noted in *D. assimilis* are also provided.—[D.H.K.]

21/7. DRYOPTERIS DILATATA (Hoffm.) A. Gray. Murray, V., 1966, Suspected poisoning by common Buckler Fern (Dryopteris family), *Ir. vet. J.*, **20**, 122-124. Drowsiness and staggering, with dilation of pupils and partial or complete blindness occurred in eight bullocks on three closely adjoined farms in Ireland. In all three cases it was noted that rhizomes of *Dryopteris dilatata* in hedgerows showed signs of having been gnawed. Some of the affected animals remained permanently blind, but all recovered their general health after treatment with vitamin B compound and purgatives.—[D.H.K.]

22. POLYSTICHUM. Sleep, A. & Reichstein, T., 1967, Der Farnbastard Polystichum × meyeri, hybr. nov. = Polystichum braunii (Spenner) Fée × P. lonchitis (L.) Roth und seine Cytologie, *Bauhinia*, **3**, 299-309. The rare hybrid *Polystichum* × *meyeri* Sleep and Reichst. = *P. braunii* (Spenner) Fée × *P. lonchitis* (L.) Roth is described. *P.* × *eberlei* D. Meyer to which the parentage was previously attributed is considered by the authors to be a synonym of *P.* × *illyricum* (Borbás) Hahne. *P.* × *meyeri* is a triploid with 123 chromosomes, most of which (*ca.* 90-100) appear as univalents at meiosis thus showing that *P. braunii* and *P. lonchitis* do

not contain common sets of chromosomes. This result is compatible with an allotetraploid origin for *P. braunii*, although both the European diploid species of *Polystichum* (*P. lonchitis* (L.) Roth and *P. setiferum* (Forskal) Woynar) can be excluded as possible ancestors.—[Authors' summary]

25. Polypodium. Meinders-Groeneveld, J. & Segal, S., 1967, Pteridologische aantekeningen, 3. De eikvaren (Polypodium vulgare L., sensu lato) in Nederland, *Gorteria*, **3**, 183-199. A study of *Polypodium vulgare* L., *sensu lato* in the Netherlands has shown that both *P. vulgare* L. *sensu stricto* and *P. interjectum* Shivas are present. Descriptions of the two species are given, together with notes on habitat preferences and associated species.

P. vulgare is widespread in many parts of the country, and is often found in more acid environments, it is not, however, calcifuge as it occurs on calcareous rocks and limestone walls. *P. interjectum* is much more restricted and is found chiefly in the calcareous dunes and in the fluviatile district of the lower regions of the Rhine and Meuse, it also occasionally grows on pollarded willows in a characteristic association including *Solanum dulcamara*, *Galeopsis tetrahit* and *Poa trivialis*, and with many berry-bearing shrubs. The sterile hybrid *P.* × *mantoniae* (*P. interjectum* × *vulgare*) has been recorded in a few localities.—[D.H.K.]

29/1. Ophioglossum vulgatum L. Mackechnie, R., 1967, Adder's Tongue (Ophioglossum vulgatum) in Lanarkshire, *Glasg. Nat.*, **18**, 520. Reports the discovery by W. A. Scott of *Ophioglossum vulgatum* near the Mousewater. *O. vulgatum* is a rare species in Lanarkshire.—[D.H.K.]

29/1b. Ophioglossum azoricum C. Presl (*O. vulgatum* L. subsp. *ambiguum* (Coss. & Germ.) E. F. Warb.). Poirion, L., 1966, Ophioglossum azoricum Presl, plante nouvelle pour la Côte d'Azur, *Riviera scient.*, **52/53**, 44. *Ophioglossum azoricum* is reported as new to the Côte d'Azur, France.—[D.H.K.]

30.→ Gymnospermae. Abbayes, H. des, 1966, Les Conifères introduites en Bretagne, *Penn ar Bed*, **5**, 262-274. Descriptive notes on the various species of the Coniferae introduced into Brittanny, arranged in two sections (1) species introduced for forestry purposes, and (2) species introduced for ornamental purposes.—[D.H.K.]

32/1. Larix decidua Mill. Sindelár, J., 1967, Poznámky k taxonomii a chorologii druhu Larix decidua Mill., *Preslia*, **39**, 352-364.

33. Pinus. Marcet, E., 1967, Über den Nachweis Spontaner Hybrider von Pinus mugo Turra und Pinus silvestris L. aufgrund von Nadelmarken, *Ber. schweiz. bot. Ges.*, **77**, 314-361. Studies on putative hybrids between *Pinus mugo* and *P. sylvestris* based on quantitative 'needle' characteristics.—[D.H.K.]

33. Pinus. Stehle, H., 1966-67, Les Pins exotiques. Digres d'interêt des le midi Mediterranneen Français, *Riviera scient.*, **52/53**, 5-12, 21-28, 37-43: *loc. cit.* **54** [pp. 8]. A detailed account of the various species of *Pinus* introduced into the French Riviera with descriptions, historical data, and a key to their identification. —[D.H.K.]

34. Juniperus. Lemoine-Sébastian, C., 1966, Le Genévriers de Bretagne, *Penn ar Bed*, **5**, 277-278. Notes on the species of *Juniperus* found in Brittanny, with a key to their identification.—[D.H.K.]

35/1. Taxus baccata L. Dizerbo, A. H., 1966, L'if, conifère spontané du Massif armoricain, *Penn ar Bed*, **5**, 275-276. A study on the status of *Taxus baccata* in the Massif armoricain, Brittanny.—[D.H.K.]

36. Caltha. Soó, R. & Kovács-Láng, E., 1966, Über einige Formenkreise der ungarischen und karpatischen flora, 2. Caltha, *Annls. Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8**, 337-344. A revision of *Caltha* in Hungary and the Carpathians. —[D.H.K.]

36/1. CALTHA PALUSTRIS L. Smit, P. G., 1967, Taxonomical and ecological studies in Caltha palustris L. (Preliminary report), *Proc. K. ned. Akad. Wet.*, **70**, 500-510. Forty-six populations of *Caltha palustris* in the Netherlands have been examined cytologically and morphologically. Two different chromosome numbers were obtained, $2n = 32$ and $2n = 56$, although the two cytotypes have different ecological preferences, the latter being found in acid, not too oligotrophic soils, while the former grows in neutral or alkaline habitats; the main morphological difference appeared to be merely in the size of the pollen grains.—[D.H.K.]

36/1. CALTHA PALUSTRIS L. Wcislo, H., 1964, Badania kariologiczne nud Caltha palustris L. s.l.—Karyological studies in Caltha palustris L. s.l., *Acta biol. Cracov., ser. Bot.*, **10**, 1-23. In 156 natural populations of *Caltha palustris* L. coll. from Poland three euploid cytotypes, $2n = 32$, 48 and 56 have been found. Plants with $2n = 32$ represent *C. palustris* subsp. *cornuta* S.N.K.; $2n = 48$ presumably corresponds to its hexaploid form. *C. palustris* subsp. *genuina* Hegi has the somatic chromosome number $2n = 56$, and the same number has been established for the subsp. *laeta* S.N.K. Deviating numbers $2n = 58$ and 60 have been detected in mixed populations ($2n = 32$ and 56) and presumably represent the results of intercrossing. The preliminary cytological examination of 10 populations of *C. palustris* collected from Czechoslavakia revealed likewise the occurrence of the two more common cytotypes: $2n = 32$ and 56; by contrast in 10 populations from Bulgaria the only cytotype found corresponds to $2n = 32$. It involves also the montane subsp. *laeta*. In spite of the opinion of some taxonomists, none of the types studied deserve the rank of separate species.—[Author's summary]

37. TROLLIUS. Doroszewska, A., 1967, Chromosomes of some Trollius species, *Acta Soc. Bot. Pol.*, **26**, 567-577. Cytological studies on a number of European and Asiatic species of *Trollius*.—[D.H.K.]

40. ACONITUM. Götz, E., 1967, Die Aconitum variegatum-Gruppe und ihre Bastarde in Europa, *Feddes Rep.*, **76**, 1-62.

41. DELPHINIUM. Munz, P. A., 1967, A synopsis of the African species of Delphinium sensu stricto, *J. Arnold Arbr.*, **48**, 249-302; *loc cit.*, **49**, 73-166.

43/1. ANEMONE NEMOROSA L. Slavíková, Z., 1968, Zur Morphologie der Blutenhülle von Ranunculaceen, 1. Anemone nemorosa L., *Preslia*, **40**, 1-12.

44. PULSATILLA. Foster, H. L., 1966, The Pasque-flowers, *Gard. J.*, **16**, 92-95. A popular account of the species and varieties of *Pulsatilla*, including *P. verna*, in cultivation.—[D.H.K.]

46. RANUNCULUS. Cook, C. D. K., 1967, Emendations to a monographic study of Ranunculus Subgenus. Batrachium (DC.) A. Gray, *Mitt. bot. StSamml., Münch.*, **6**, 621-622. A few minor emendations, none of which affect British species, are given to the author's monograph of *Ranunculus* subgenus *Batrachium* (1966, *Mitt. bot. StSamml., Münch.*, **6**, 47-237).—[D.H.K.]

46. RANUNCULUS. Ryvarder, L., 1967, Ranunculus cymbalaria Pursh in Europe and its seed dispersal, *Nytt Mag. Bot.*, **14**, 109-114. The distribution of the North American species *Ranunculus cymbalaria* Pursh on the coasts of northern Europe is reviewed. Experiments have shown that diaspores of the species are able to float in sea water for up to 120 days without losing germination capacity. It is concluded that this is too short a time to allow seed dispersal by ocean currents from America to Europe, and it is suggested that the species was originally introduced into Europe with ships ballast.—[D.H.K.]

46/9. RANUNCULUS PARVIFLORUS L. Jeno, T. & Zsigmond, V. L., 1967, A Ranunculus parviflorus L. Magyarországon, *Bot. Közl.*, **54**, 165-166. Notes on *Ranunculus parviflorus* in Hungary.—[D.H.K.]

46/10. Ranunculus auricomus L. Fagerström, L., 1967, Neue Sippen des Ranunculus auricomus—Komplexes aus der Sowejetunion, *Acta Soc. Fauna Flora Fenn.*, **79** (2), 1-15. Five new subspecies of *Ranunculus cassubicus* L. are described and illustrated from the U.S.S.R.—[D.H.K.]

46/10. Ranunculus auricomus L. Fagerström, L., 1967, Neue Sippen des Ranunculus auricomus—Komplexes aus Finnland, 2, *Acta Soc. Fauna Flora Fenn.*, **79** (1), 1-63. Eight new subspecies of *Ranunculus fallax* (W. & Gr.) Schur, and eight new subspecies of *R. auricomus* are described and illustrated from Finland.—[D.H.K.]

46/24. Ranunculus ficaria L. Soó, R. & Borhidi, A., 1966, Über einige Formenkreise der ungarischen und karpatischen Flora, 4. Ficaria, *Annls Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8,** 297-300. A revision of the subspecies and forms of *Ranunculus ficaria* in Hungary and the Carpathians.—[D.H.K.]

48/1. Myosurus minimus L. Slavíková, J., 1967, Výskyt myšího ocásku (Myosurus minimus L.) u Blatná, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2,** 221-223. An account of the discovery of *Myosurus minimus* at Blatná, Southern Bohemia.—[D.H.K.]

49. Aquilegia. Soó, R. & Endrödy-Kovács, E., 1966, Über einige Formenkreise der ungarischen und karpatischen Flora, 3. Aquilegia, *Annls. Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8,** 301-308. A revision of *Aquilegia* in Hungary and the Carpathians.—[D.H.K.]

49. Aquilegia. Taylor, R. J., 1967, Interspecific hybridization and its evolutionary significance in the genus Aquilegia, *Brittonia*, **19,** 374-390.

50. Thalictrum. Soó, R., 1966, Übersicht kritischer Formenkreise in der Flora von Mittel-und Südosteuropa, 1, *Annls. Univ. Scient. bpest. Rolando Eötvös* (*Biol.*), **8,** 285-296. Includes a part revision of *Thalictrum* in mid- and south-east Europe.—[D.H.K.]

55. Nymphaea. Radics, F., 1964, A revision of the Nymphaea material in Hungarian Natural History Museum, *Ann. Mus. Hung.*, **59,** 135-145. A study of approximately 100 herbarium specimens of *Nymphaea* collected in the Carpathians Basin during the last century leads to the conclusion that all are of hybrid origin. The parents, which are apparently absent from the area, appear to be *N. alba*, *N. candida* Presl and *N. tetragona* Georgi. The hybrid populations are all fertile, and their origins and the absence of the putative parents present phytogeographical problems which have yet to be investigated.—[D.H.K.]

55. Nymphaea.—See 251. Daphne.

56. Nuphar.—See 251. Daphne.

58. Papaver. Landolt, E., 1967, Papaver apulum Ten. am Alpensüdfuss, *Bauhinia*, **3,** 265-268. *Papaver apulum* Ten., a Mediterranean species allied to *P. hybridum* and *P. argemone*, has long been established in calcareous places near Lake Lugano, Italy. A key is given to distinguish between the three species, and illustrations of the capsules are provided.—[D.H.K.]

58. Papaver. Vent, W., Rändel, W. & Wendt, N., 1968, Beiträge zur Kenntnis der Sippenstrukter von Papaver atlanticum (Ball) Coss. und Papaver rupifragum Boiss. et Reut., *Feddes Rep.*, **77,** 47-56. Studies on the Mediterranean species *Papaver atlanticum* and *P. rupifragum*. *P. rupifragum* var. *rupifragum* occurs in southern Spain, and its var. *maroccanum* Font-Quer & Pau is found in North Africa. *P. atlanticum* var. *atlanticum* grows in the higher zones of the Atlas Mountains, while var. *mesatlanticum* Maire is found at lower altitudes of the Atlas Mountains.—[D.H.K.]

59. Meconopsis. Ratter, J. A., 1968, Cytological studies in Meconopsis, *Notes R. bot. Gdn. Edinb.*, **28,** 191-200. Chromosome numbers are given for 18 species of *Meconopsis*. *M. cambrica* is a tetraploid with $n = 14$.—[D.H.K.]

59/1. MECONOPSIS CAMBRICA (L.) Vig.—See 162. TILIA.

61. GLAUCIUM. Cullen, J., 1967, Notes on the cultivated species of Glaucium and Dicranostigma [Papaveraceae], *Baileya*, **15**, 112-117. Descriptions, and a key, are provided to the identification of the four species of *Glaucium* known to be in cultivation, viz. *G. corniculatum* (L.) Rudolph, *G. flavum* Crantz, *G. grandiflorum* Boiss. & Huet. (*G. corniculatum* p.p.) and *G. oxylobum* Boiss. & Bushe.

G. grandiflorum is very similar to *G. corniculatum*, but much more showy, with larger, usually red flowers, borne on longer peduncles.—[D.H.K.]

62/1. CHELIDONIUM MAJUS L.—See 162. TILIA.

67. BRASSICA. Dass, H. & Nybom, N., 1967, The relationship between Brassica nigra, B. campestris, B. oleracea and the amphidiploid hybrids studied by means of numerical taxonomy, *Can. J. Genet. Cytol.*, **9**, 880-890.

67/1. BRASSICA OLERACEA L. Nasrallah, M. E. & Wallace, D. H., 1967, Immunogenetics of self-incompatibility in Brassica oleracea L., *Heredity*, **22**, 519-527.

67/3. BRASSICA RAPA L. Srinivasacher, D. & Singh, K., 1968, Induced allopolyploidization of autotetraploid Brassica campestris, *Genetica*, **38**, 375-380.

74. RAPHANUS. Panetsos, C. A. & Baker, H. G., 1968, The origin of variation in 'wild' Raphanus sativus (Cruciferae), *Genetica*, **38**, 243-274. Analyses of populations of *Raphanus* growing in the central part of California, from the Sierra Nevada foothills to the Pacific coast, show that pure *R. raphanistrum* can be found only in the Central Valley, while over the remainder of the area populations of so-called 'wild' (weedy) *R. sativus* occur. More detailed morphological studies of a number of populations in this area have revealed that the populations of the 'wild' *R. sativus* originated by the hybridization of the cultivated forms of this species (the radish) with another introduced species, already a weed, *R. raphanistrum.*

The composition of each hybrid population with respect to the proportion of characters of the one or the other species depends upon the habitat it occupies and its geographic location. Populations in inland areas display a high proportion of *R. raphanistrum* characters, while in those near the coast *R. sativus* characters predominate.

Artificial hybrids between *R. raphanistrum* and a cultivated form of *R. sativus* exhibited about 50% pollen fertility and were heterozygous for a reciprocal translocation. Examination of 'wild' populations of *R. sativus* revealed that plants heterozygous for a reciprocal translocation are present in varying proportions. Experimental evidence is produced to show that this translocation is identical with that separating *R. raphanistrum* from cultivated forms of *R. sativus.* Thus a cytological proof of the introgression is added to the morphological evidence. Introgression of *R. raphanistrum* characters appear to have been a major factor in converting the erstwhile crop plant *R. sativus* into a highly successful weed in California.—[Authors' Summary]

75/1. CRAMBE MARITIMA L. de Visser, A., 1968, Over Crambe maritima L. in Nederland, *Gorteria*, **4**, 1-2. The increase of *Crambe maritima* in the Netherlands in the last decennium is reviewed, and various habitats of the species in the islands of Walcheren and Noord-Beveland (prov. Zeeland) are described.—[D.H.K.]

75/1. CRAMBE MARITIMA L. Van Ooststroom, S. J. & Mennema, J., 1968, Overzicht der vondsten van Crambe maritima L. in Nederland, *Gorteria*, **4**, 2-5. A list of localities in which *Crambe maritima* occurs in the Netherlands is provided, and its distribution in the country is illustrated by a map.—[D.H.K.]

81. CARDARIA. Hejný, S., 1966, Pokyny k Sberu mapovanýeh rostlin Cardaria draba (L.) Desv., *Zprávy Cesk. Bot. Spolecn. CSAV*, **1**, 73-74. A key is provided to the subspecies and varieties of *Cardaria draba* and related species.—[D.H.K.]

84. Thlaspi. Polatschek, A., 1967, Cytotaxonomische Beiträge zu den Gattungen Thlaspi und Hutchinsia, *Annln nat. Mus. Wien*, **70**, 29-35. Cytotaxonomical studies on *Thlaspi alliaceum*, $2n = 14$, *T. arvense* and *Hutchinsia alpina* subsp. *alpina* and subsp. *brevicaulis* (Hoppe) Arcangeli.—[D.H.K.]

84/2. Thlaspi alliaceum L. Dvoráková, M., 1967, K výskytu Thlaspi alliaceum L. v Ceskoslovensku, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2**, 97-99. *Thlaspi alliaceum* is recorded as an adventive new to Czechoslovakia, and a description and illustration of the plant are provided.—[D.H.K.]

88/6. Cochlearia anglica L. Binet, P., 1967, Cultures sans sol de Cochlearia anglica L., *Revue gén. Bot.*, **74**, 135-156. Experiments with cultures of *Cochlearia anglica* in various liquid media without soil are described and the need for low temperatures and other factors for good germination is demonstrated.—[E.B.B.]

91. Alyssum. Dudley, T. R., 1966, Ornamental Madworts (Alyssum) and the correct name of the Golden-tuft Alyssum, *Arnoldia*, **26** (6-7), 33-45.

94. Draba. Buttler, K. P., 1967, Zytotaxonomische Untersuchungen an Mittel- und Südeuropäischen Draba-Arten, *Mitt. bot. StSamml., Münch.*, **6**, 275-362. A comprehensive study of *Draba*, including the *D. norvegica* and *D. incana* complexes, in mid- and southern Europe [D.H.K.]

96/1. Armoracia rusticana Gaertn., Mey. & Scherb. Sckeel, H., 1966, Untersuchungen über einen weissbunton Klon von Armoracia lapathifolia Gilib., *Züchter*, **36**, 135-139.

99. Cardaminopsis. Burdet, H. M., 1967, Contribution à l'étude caryologique des genres Cardaminopsis, Turritis et Arabis en Europe, *Candollea*, **22**, 107-156. The caryology of the European species of the genera *Cardaminopsis*, *Turritis* and *Arabis* is reviewed by six different methods, and details of published chromosome numbers for species of the various genera are given. A number of new chromosome counts are provided, and various nomenclatural changes are made.—[D.H.K.]

100. Arabis.—See 99. Cardaminopsis.

101. Turritis.—See 99. Cardaminopsis.

102. Nasturtium. Holub, J. & Tomsovic, P., 1967, Okruh Nasturtium officinale v Ceskoslovensku, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2**, 74-77. Studies on the *Nasturtium officinale* aggregate in Czechoslovakia have shown that both *N. officinale* R. Br., *sensu stricto* and *N. microphyllum* occur. The differences between the two species are given, and their distributions in the country are outlined.—[D.H.K.]

102. Rorippa. Borsos, O., 1967, Über einige Rorippa und Veronica Arten (Vorläufige mitteilung), *Acta Bot. Sci. Hung.*, **13**, 1-10. Systematic notes on *Rorippa sylvestris* and *R. kerneri*, *Veronica hederifolia* subsp. *hederifolia* and subsp. *trifolia*, and *V. longifolia* subsp. *longifolia* and subsp. *maritima*.—[D.H.K.]

102. Rorippa. Jonsell, B., 1968, Studies in the north-western European species of Rorippa s.str., *Symb. bot. upsal.*, **19** (2). Pp. 222 + 11 plates. A revision of *Rorippa* in north-western Europe, with particular reference to the spread of certain species as weeds in Scandinavia. The study is based on herbarium material, and living plants particularly from Scandinavia, and the data is obtained from morphological, cytological, ecological and breeding experiments.

R. islandica sensu lato in north-west Europe consists of two species:— **R. islandica** (Oeder ex Murray) Borbás subsp. **islandica** (*Nasturtium palustre* (L.) DC., *R. pusillum* (Vill.) DC.) $2n = 16$ an invariably prostrate plant, with leaves with narrow and numerous lateral segments, together with a very small terminal lobe. Its petioles have inconspicuous wings and no auricles, and its ripe pods are often very large with pronounced rectangular valves. It has a very restricted

Atlantic coastal distribution—Greenland, Iceland, Norway, W. Ireland, Isle of Man and Scotland, and occurs again in disjunct areas in central Europe—the Alps and Pyrenees. The subsp. *dogadovae* is found in S.E. Russia and W. Siberia. It is never found growing in association with *R. palustris*.

The second species **R. palustris** (L.) Besser subsp. **palustris** (*Nasturtium palustre* (L.) DC., non Crantz., *R. islandica* auct. eur. occident., non (Oeder ex Murray) Borbás) is widespread on river banks, damp waste ground, etc., all over Europe except in the Meditteranean region. In north-west Europe it shows little variability except in N. Fennoscandia, where pod shape and leaf shape vary considerably. This suggests the partial amalgamation in the latter region of an indigenous primarily alluvial population on the one hand, and populations of introduced weedy forms on the other.

In N. America, *R. palustris* is much more variable than in Europe, and certain exclusively N. American subspecies—subsp. *fernaldiana*, subsp. *hispida* and subsp. *occidentalis*—are recognized. The author considers, however, that there are no well defined differences between European and N. American material, and that much of the latter is referable to subsp. *palustris*.

R. sylvestris, which is morphologically very variable in many characters, forms strongly self-incompatible clones. These are usually tetra- or hexaploid, rarely pentaploid, and the cytotypes are not always morphologically recognizable, though there is a tendency to larger organs in the hexaploids. The species, though widespread over much of Europe, is doubtfully native in Scandinavia, and there is usually only one clone present in a locality, thus new biotypes are rarely seen. By means of vegetative dispersal a clone often attains a wide distribution, and it is sometimes possible to discern distinct groups of clones; one tetraploid of slender habit found on shores; one hexaploid of vigorous weeds and another hexaploid of weeds with nonaperture pollen; these groups are, however, extremes, and most clones are in various respects intermediate between them. It is concluded, therefore, that no taxonomic subdivision of N.W. European *R. sylvestris* is justifiable. Aneuploid *R. sylvestris* clones were obtained from experimental crosses but have not been detected in the wild. The species was first recorded in Scandinavia as a coastal plant, where it seems always to be tetraploid. During the 19th century it spread extensively as an anthropochore, especially to harbours with ballast, and more recently it has been spread with garden soil. It seems unlikely, however, that the old coastal populations have contributed to this spread.

R. amphibia is known in Scandinavia only as a tetraploid, but diploids are known from W. Europe. In England the Thames-side plant is exclusively diploid, though tetraploid plants occur commonly elsewhere. No taxonomic subdivision based on the cytotypes appears practical. The species is self-incompatible and occurs in clones that are mainly propagated and dispersed vegetatively.

R. austriaca, only known as a diploid, is a rare adventive in Scandinavia persisting only in a few Danish and Norwegian localities where it is believed to have been introduced with grain.

Hybrids between certain species are quite frequent. Between tetraploid *R. amphibia* and tetra-hexaploid *R. sylvestris* crosses are easily obtained both experimentally and in nature. They are tetra- and pentaploid respectively, and are usually fertile. Tetraploid hybrids back- and intercross, thus resulting in an extremely variable series of biotypes; references are made to areas at Lake Mälaren and parts of Skåne where such introgression is present. In England extensive introgression is reported from the Severn from Shrewsbury to Gloucestershire, where *R. amphibia* × *sylvestris* occurs in quantity, but no 'pure' *R. sylvestris* has been seen, similar instances are also recorded from the Avon, Ouse and Cam. These hybrids are confined to the banks of rivers and streams and do not spread as weeds.

Hybrids between *R. amphibia* and *R. palustris* were obtained experimentally, they are not known in nature in Scandinavia, and though apparently rare, have been confirmed from England, e.g. by the Thames between Hammersmith and Kew, and elsewhere. The plant is quite sterile but spreads vegetatively.

R. palustris × *sylvestris* is very rarely found in nature and was not obtained experimentally.

R. austriaca × *sylvestris* occurs in tetraploid, self-incompatible, but fertile clones that have been independently introduced into Scandinavia chiefly as seeds with cereals. It was unknown prior to 1900 but has spread in recent times and persists in a number of localities. Material from England closely resembling these hybrids has been seen, but confirmation is required before their identity can be established with certainty. Triploid hybrids between *R. austriaca* and *R. sylvestris* were obtained experimentally, but have not been seen in nature.

The following key is provided to the identification of the species and hybrids of *Rorippa*.

Petals and sepals of about equal length. Rooting stem portions and root runners absents

Pods 2-3 times as long as their pedicels. Sepals shorter than 1.6 mm. Seeds very finely colliculate .. .. *R. islandica*

Pods not more than *C.* 0·2 times as long as their pedicels. Sepals longer than 1·6 mm. Seeds more coarsely colliculate .. .. .. *R. palustris*

Petals at least 1·5 times as long as the sepals. Rooting stem portions or root runners present.

Cauline leaves with prominent, often nearly clasping auricles.

Leaves not lobate. Pods spheroid .. .. .. *R. austriaca*

Leaves lobate. Pods ellipsoid-oblong.

Petals shorter than 3·5 mm. Cauline leaves about 4 times as long as broad, rather coarsely serrate .. *R. amphibia* × *palustris*

Petals usually longer than 3·5 mm. Cauline leaves 2-3 times as long as broad, usually acutely serrate .. *R. austriaca* × *sylvestris*

Cauline leaves with no, or inconspicuous, auricles.

Upper cauline leaves not lobate. Pods spheroid-ellipsoid .. *R. amphibia*

Upper cauline leaves lobate.

Cauline leaves deeply pinnatisect. Terminal segment short and narrow. Styles shorter than 1·2 mm.

Ripe pods not broader than 1·2 mm.; unfertilized ovaries linear. Petals nearly always larger than 3·0 mm. .. *R. sylvestris*

Ripe pods 1·3-1·5 mm. broad; unfertilized ovaries narrowly ellipsoid. Petals shorter than 3·0 mm. *R. palustris* × *sylvestris*

Cauline leaves pinnatifid-pinnatisect. Terminal segment 1/4-2/3 of the total leaf-length broad. Styles nearly always longer than 1·2 mm. Ripe pods at least *c.* 1·5 mm. broad.

In fruit with most pedicels deflexed from the base .. .. .. *R. amphibia* × *sylvestris*

In fruit with ascending-horizontal pedicels *R. austriaca* × *sylvestris*

—[D.H.K.]

104. HESPERIS. Dvorák, F., 1967, Hybrids of the genus Hesperis, *Feddes Rep.*, **75,** 67-88. The taxon *Hesperis silvestris* Crantz. var. *pachycarpa* Borbás (1902, *Magyar Bot. Lap.*, **1,** 376) is shown to be a hybrid between *H. matronalis* and *H. sylvestris*.

Both **H. matronalis** subsp. **matronalis,** with red, mauve, rarely violet flowers, and **H. matronalis** subsp. **nivea** (Baumg.) Kulzc., with white flowers are commonly grown in gardens and become naturalised escapes. The hybrid between *H. matronalis* subsp. *matronalis* and subsp. *nivea* is also in cultivation.—[D.H.K.]

104. HESPERIS. Dvorák, F., 1967, Further chapter from the study on Hesperis sylvestris, *Phyton*, **12**, 6-30. Preliminary studies towards a monograph of *Hesperis sylvestris*, with descriptions of varieties, hybrids, outlines of geographical distribution, etc.—[D.H.K.]

108. SISYMBRIUM. Khoshoo, T. N., 1966, Variation and evolution in some species of the genus Sisymbrium, *Indian J. Gen.*, **26A**, 247-257. Studies on the evolution and variation of a number of species of *Sisymbrium*, including *S. loeselii*, *S. irio* and *S. orientale*.—[D.H.K.]

111/L. LUNARIA ANNUA L. Pierik, R. L. M., 1967, Regeneration, vernalization and flowering in Lunaria annua L. in vivo and in vitro, *Meded. LandbHoogesch. Wageringen*, **67** (6). Pp. 71.

113. VIOLA. Dizerbo, A.-H., 1967, Etude de Viola silvestris (Lmk.) Rchb. et de Viola riviniana ssp. riviniana dans le Massif Armoricain, *Bull. Soc. Bot. Scient. Bretagne*, **41**, 131-139, 193-219. The taxonomic history and distribution, both general and particularly in Brittany, are dealt with in this study. Biometrical statistics of morphological characters are presented and discussed, illustrated by tables and, in the case of the stipules, by diagrams. The taxonomic characters usually used by authors are examined and the following conclusions arrived at:

1. Although the habit of the two species is different this is often difficult to assess.
2. The leaves of *V. reichenbachiana* (*V. sylvestris*) are more elongated than those of *V. riviniana* subsp. *riviniana*, the same applying to primordial leaves and cotyledons.
3. The morphology of the spur corresponds to the usual diagnoses but that of the latter is often pigmented.
4. The characters usually referred to in relation to the position of the sepals on the fruit are valid.
5. Characters concerning the pilosity of the style are not sufficiently precise.
6. The same applies to the characters of the stipules.
7. Seed-weight is a good character.

In general the vegetative and reproductive organs of *V. reichenbachiana* are smaller than those of the other species. The first chasmogamic flowers do not come to fruit, seeds coming from the withered chasmogamic flowers of the last flowering.—[E.B.B.]

113. VIOLA. Skalický, V., 1966, Poznámky k urcování a Sbery ceskoslovenských druhu Violek Seckce Hypocarpae (Viola L. Sect. Hypocarpae Godr.), *Zprávy Cesk. Bot. Spolecn. CSAV*, **1**, 4-17. Studies on the Czechoslovakian species of *Viola* Section *Hypocarpae*, including *V. collina* Bess. (*V. collina* sensu Gregory, *British Violets*, 1912), *V. hirta* and *V. odorata*.—[D.H.K.]

113. VIOLA. Veerman, A. & Van Zon, J.C.J., 1965, Insect pollination of pansies (Viola Spp.), *Entomol. Exper. Appl.*, **8**, 123—134.

115. HYPERICUM. Schwarz, O., 1965, Die Kritischen Hypericum-Arten der mittel-europäischen Flora, *Drudea*, **5**, 59-66.

122/1. ELATINE HEXANDRA (Lapierre) DC. Salisbury, E. J., 1967, On the reproduction and biology of Elatine hexandra (Lapierre) DC. (Elatinaceae); a typical species of exposed mud, *Kew Bull.*, **21**, 137-149. *Elatine hexandra* is a small annual shown to be primarily adapted for chasmogamous reproduction on the mud periodically exposed in dry seasons. Secondarily, it may occur as a submerged plant reproducing cleistogamously. Data is furnished that shows the seed output to be very large in relation to the size of the plant. Experiments are reported which demonstrate that germination can occur in both long and short days, but that exposure to light of sufficient intensity and duration is requisite to produce a high percentage germination. The facts accord with the postulate of an inhibitor exhibiting "normal variation" in amount from seed to seed and inactivated by light. In bright light, germination may be quasi-simultaneous.

In its early stages the seedling is supported by 'prop-hairs' developed around the base of the radicle. The biological significance of these features is discussed. —[D.H.K.]

123.→ Caryophyllaceae. Micle, F., 1967, Studiul germinatiei unor specii din Familion Caryophyllaceae în functie de Vîrsta semintelor, *Contrib. Bot.* ("*Univ. Babes Bolyai*"). *Omagia octogenarului professor Dr. docent Alexandra Borza*, 217-221. Studies on germination in a number of species of the Caryophyllaceae, including *Dianthus deltoides, Lychnis coronaria, Gypsophila paniculata and Cerastium biebersteinii.*—[D.H.K.]

123. Silene. Bocquet, G., 1967, Physolichnidium olim Gadstrolychnidium nomenclaturae fundamentum includens combinationes taxaque nova nonnula Silenes generis, *Candollea*, **22,** 1-38. A summary of a monograph of *Silene* sect. *Physolychnis* which will be published later. It comprises a list of 62 species accepted by the author of which 11 are new to science. Numerous new names and combinations are published. The species treated are grouped under the following four areas:—Mid-Asia, Arctic, N. America and S. America.—[D.H.K.]

123. Silene. Huber-Morath, A., Coode, M. J. E. & Cullen, J., 1967, Material for a Flora of Turkey, 13 Silene L., *Notes R. Bot. Gdn. Edinb.*, **28,** 1-8. A number of new species and subspecies are described from Turkey, and various other nomenclatural changes are made including the reduction of *Silene vulgaris* subsp., *macrocarpa* Turrill to **S. vulgaris** var. **commutata** (Guss.) Coode & Cullen, stat. nov. based on *S. commutata* Guss. (1824, *Fl. Sic. Prodr.*, **1,** 499).—[D.H.K.]

123/8. Silene armeria L. Wellensick, S.J., 1968, Floral induction through the roots of Silene armeria L., *Acta bot. neerl.*, **17,** 5-8.

123/13. Silene dioica (L.) Clairv. Wittenberger, G. & Wittenberger, W., 1967, Abnormitäten bei Melandrium rubrum (Weigel) Garcke in der Umgeburg von Bad Aussee, *Ost. bot. Z.*, **114,** 242-244.

123/14. Silene alba (Mill.) E. H. Krause. Mulcahy, D. L., 1967, The optimal sex ratio in Silene alba, *Heredity*, **22,** 411-424.

131. Cerastium. Möschl, W., 1966, De Cerastiis Florae Iranicae. Vorarbeiten zu Flora Iranica Nr.14, *Sber. Akad. Wiss. Wien*, **175,** 159-214 + Taf. 6. A revision of the Iranian species of *Cerastium*, many of which occur also in Britain. —[D.H.K.]

131. Cerastium. Smejkal, M., 1967, Urcovaeí Klíc a prehled ceskoslovenských druhu a poddruhu rodu Cerastium L., *Zprávy Cesk. Bot. Spolecn. CSAV*, **2,** 137-146. Descriptions, synonomy, distributions, etc., are provided for the species of *Cerastium* occurring in Czechoslovakia, together with a key to their identification.—[D.H.K.]

133. Stellaria. Whitehead, F. N. & Sinha, R. P., 1967, Taxonomy and taximetrics of Stellaria media (L.) Vill., S. neglecta Weihe and S. pallida (Dumor.) Piré, *New Phytol.*, **66,** 769-784. Although *Stellaria media, S. neglecta* and *S. pallida* differ in ecological requirements, phenological behaviour and in cytology, morphological differences are much less marked. After being studied morphometrically by computer it was shown that *S. pallida* was clearly separable from *S. media* and *S. neglecta.* The latter two, though separable, were found to have intergrading morphometric features. The length and weight of seeds, length of tubercles and pollen diameter were shown to be the most significant characters and therefore suitable for the construction of a key to separate the three species. —[D.H.K.]

136/6 SAGINA SAGINOIDES (L.) Karst. Anthony, J., 1967, Sagina saginoides (L.) Karst. in West Sutherland (v.c. 108), *Trans. Proc. bot. Soc. Edinb.*, **40**, 335.

137. MINUARTIA. Favarger, C., 1967, Nombres chromosomiques de quelques taxa principalement balkaniques du genre Minuartia (L.) Hiern, *Bot. Jb.*, **86**, 280-292. Chromosome numbers are given for many species of *Minuartia*, especially from the Balkans. A new basic (secondary) number for the genus is stated to be $x = 16$, characteristic of the Graminifoliae.—[E.B.B.]

137/1. MINUARTIA VERNA (L.) Hiern. McAllister, A. H., 1967, Minuartia verna in Ayrshire, *Glasg. Nat.*, **18**, 520. The discovery of *Minuartia verna* near Girvan Ayrshire in 1964, is recorded, and details of associated species are provided. —[D.H.K.]

139/1. HONKENYA PEPLOIDES (L.) Ehrh. Goas, M. & Guédes, H., 1967, Sur la levée de dormance des graines de Honkenya peploides (L.) Ehrh., *Bull. Soc. Scient. Bretagne*, **41**, 165-174. A study of the germination of seeds of *Honkenya peploides* reveals a tegumentary inhibition causing prolonged dormancy.—[D.H.K.]

140. MOEHRINGIA. Merxmüller, H. & Grau, J., 1967, Moehringia-Studien, *Mitt. bot. StSamml., Münch.*, **6**, 257-273. Cytotaxonomic studies on European species of *Moehringia*, including a description and illustration of *M. provincialis* Merxm. & Grau, sp.nov., from the Provençal Alps. A key is given to the determination of the species discussed.—[D.H.K.]

143/1. SPERGULARIA RUBRA (L.) J. & C. Presl. Goodwillie, R.N., 1968, Spergularia rubra in Co. Wicklow, *Ir. Nat. J.*, **16**, 26. Reports the discovery in 1965, and subsequent increase, of *Spergularia rubra* in Co. Wicklow. New to the county, it is suspected to have been introduced with agricultural machinery or sheep from another district.—[D.H.K.]

145. ILLECEBRACEAE. Brummitt, R. K. & Chauduhri, M. N., 1967, Materials for a Flora of Turkey, 15. Illecebraceae, *Notes R. bot. Gdn. Edinb.*, **28**, 25-28. Two new species of *Herniaria* and a new species of *Paronychia* are described from Turkey.—[D.H.K.]

149. MONTIA. Nilsson, Ö., 1967, Studies in Montia L. and Claytonia L. and allied genera, *Grana Palynol.*, **7**, 280-363. An exhaustive study of the palynology of a number of genera of the Portulacaceae. The taxonomy of a number of genera are discussed, and *Montia perfoliata* and *M. sibirica* are retained under the genus *Claytonia*. The following chromosome numbers are reported:— *C. sibirica* from Alaska, California and British Columbia, all $2n = 12$; *C. perfoliata* from the Botanic Garden, Leiden, Holland, $2n = 36$; from Washington U.S.A., $2n = 48$, and from California $2n = 12$ and 24.

Montia fontana from Sweden, Norway, Greenland and Canada, all $2n = 20$; from Skane, Sweden, $2n = 40$; *M. rivularis* C.C. Gmel from Belgium, $2n = 20$. —[D.H.K.]

150. CLAYTONIA. Davis, R. J., 1966, The North American species of Claytonia, *Brittonia*, **18**, 285-303.

150. CLAYTONIA.—See 149. MONTIA.

153. AMARANTHUS. Grüll, F. & Priszter, S., 1967, Die Variabilität und Verbreitung einiger Amaranthus-Arten auf der Ablagerungsplätzen und Schutthalden der Stadt Brno, *Preslia*, **39**, 306—311. A revision of *Amaranthus* species found in the Brno district of Czechoslovakia.—[D.H.K.]

153. AMARANTHUS. Sauer, J. D., 1967, The grain Amaranthus and their relatives : a revised taxonomic and geographic survey, *Ann. Mo. bot. Gdn.*, **54**, 103-137. A revision of the grain *Amaranthus*, some of which have occurred as adventives in Britain.—[D.H.K.]

154.→CHENOPODIACEAE. Aellen, P., 1967, New Chenopodiaceae from Turkey, *Notes R. bot. Gdn. Edinb.*, **28**, 29-34. A number of new species and subspecies of *Beta, Chenopodium, Atriplex, Suaeda* and *Salsola* are described from Turkey. —[D.H.K.]

154. →CHENOPODIACEAE. Debray, M. M., 1967, Sur quelques récoltes havraises de Chénopodiaceés, *Bull. Soc. géol. Normandie*, **56**, 56-57. Four species of the Chenopodiaceae claimed as new to the estuary of the Seine are recorded and discussed. A single plant of *Chenopodium chenopodioides* (L.) Aellen was found in 1962 in the commune of Gonfreville-l'Orcher but the species has not been seen there since. *Atriplex littoralis, A. longipes* Drejer, and *A. glabriuscula* have also been found. All four grow in company with species which owe their occurrence to human activity, but it is suggested that they may have been brought as seeds by migrating birds, and the need is stressed for thorough investigations before the halophytes on the north bank of the estuary are destroyed by the extension of the industrial zone of the port of L'Havre.—[J.E.L.]

154. CHENOPODIUM. Poggiali, R. M., 1967, Alcune osservazioni dei semidi Chenopodium, *Webbia*, **22**, 67-74. Studies on the influence of white and red light on the germination of seeds of *Chenopodium album* and *C. ambrosioides* L—[D.H.K.]

154/4. CHENOPODIUM ALBUM L. Karssen, C. M., 1967, The light promoted germination of the seeds of Chenopodium album L. The influence of the incubation time on quantity and rate of response to red light, *Acta. bot. neerl.* **16,** 156-160.

154/5. CHENOPODIUM SUECICUM J. Murr. Pedersen, A., 1967, Hvad er Chenopodium suecicum Murr (C. viride L. sensu Aellen) Grøn Gøsefod?, *Flora Fauna, Silkeborg*, **73,** 127-131. *Chenopodium suecicum* is recorded from northern Denmark where hitherto it had been confused with *C. album* var. *cymigerum* Koch.—[D.H.K.]

156/5. ATRIPLEX LACINIATA L. Rickman, H., 1967, Fortsatt invasion på Skåne—Kutsen av Atriplex sabulosa, *Bot. Notiser*, **120**, 374-375. The occurrence of *Atriplex laciniata* in abundance on the coasts of the Swedish province of Skåne is reported and commented upon.—[D.H.K.]

159/2. SALSOLA KALI L. subsp. RUTHENICA (Iljin) Soó (*S. pestifer* A. Nels.) Isom, W. H., Jordan, L. S., Wright, W. W. & May, D. M., 1967, Chemical control of Russian Thistle, *Down to Earth*, 22, 12-13. Notes on three trials in using various herbicides for the attempted control of the aggressive adventure weed *Salsola kali* subsp. *ruthenica* at different localities near Lancaster, California.—[D.H.K.]

160. SALICORNIA. Tölken, H. R., 1967, The species of Arthrocnemum and Salicornia (Chenopodiaceae) in Southern Africa, *Bothalia*, **9**, 255-307. A revision of *Arthrocnemum* and *Salicornia* in Southern Africa with full descriptions, synonymy, geographical distributions, keys to the identification of species etc. Several British species are included in the account.—[D.H.K.]

160/3. SALICORNIA EUROPAEA L. Langlois, J., 1967, Cultures sans sol des Salicornia stricta Dumort., *Revue gén. Bot.*, **74**, 176-196. Experiments on cultures without soil of *Salicornia europaea* (*S. stricta*) are described to study factors favourable to its growth. [E.B.B.]

160/T. TETRAGONIA TETRAGONIOIDES (Pall.) O. Kuntze. Prakash, N., 1967, Life History of Tetragonia tetragonioides (Pall.) O. Kuntze, *Aust. J. Bot.*, **13,** 413-424.

162. TILIA. Hadfield, M., 1967. The seedlings of lime trees, *Gdnrs' Chron.* **162** (10), 12-13. Notes on the germination, and seedlings of *Tilia platyphyllos, T. cordata* and *T.* × *vulgaris* Hayne (*T. europaea* auct.) under natural and experimental conditions. The south-eastern European species *T. petiolaris* DC. is widely planted and the author suggests that it may regenerate in Britain.—[D.H.K.]

162. Tilia. Knowles, E., 1967, Cultivars of British wild plants, 25. Limes, Mallows, Flaxes and Poppies, *Gdnrs' Chron.*, **162**(13), 14. *Tilia cordata* and *T. platyphyllos* are both in cultivation, and cultivars of the latter include "Asplenifolia", a smaller tree with jaggedly lobed smaller leaves than its wild counterpart; "Obliqua", with leaves more usually oblique at the base ; "Aurantia", with yellow-orange shoots ; "Tortuosa", with shoots twisted and curled ; "Pyramidalis", a taller tree with a more slender crown ; "Vitifolia", with lobed leaves ½″-1″ long, which turn to an attractive shade of yellow in the autumn.

Linum perenne subsp. *anglicum* is grown in gardens, often as the cultivar "Lewisii", a plant up to 2 ft tall with blue flowers ; "Album", a white-flowered plant is also cultivated.

Malva sylvestris sometimes appears in cultivation as the cultivar "Zebrina", which has whitish flowers, striped purple and white. *M. moschata* and its cultivar "Alba", with white flowers are also grown.

Meconopsis cambrica and its double-flowered form are frequently grown, and *Chelidonium majus* f. *pleno* and "laciniatum", which has leaves with many lobes and petals with laciniate margins, are also sometimes seen.—[D.H.K.]

163. Malva. Slavík, B., 1967, Poznámky k urcování sberu a rozšíerní slézu (rod Malva) na uzemí CSSR, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2**, 43-50. The native and adventive species of *Malva* found in Czechoslovakia are described, and a key is provided to their identification.—[D.H.K.]

163. Malva.—See 162. Tilia.

163/6. Malva parviflora L. Sumner, D. C. & Cobb, R. A., 1967, Germination characteristics of cheese-weed (Malva parviflora) seeds, *Agron. J.*, **59**, 207-208. Studies on *Malva parviflora* in the United States has shown that the seed coat is impermeable to water; this delays germination, but it is likely that other factors are also involved.—[D.H.K.]

166. Linum.—See 168.→ Geraniaceae.

166/3. Linum perenne L. subsp. anglicum (Mill.) Ockendon. Gaukler, K., 1964, Linum anglicum Miller—neue für Bayern, *Ber. bayer. bot. Ges.*, **37**, 104-105. *Linum perenne* subsp. *anglicum* is reported as new for Bavaria. Details are given of the habitat and associated species.—[D.H.K.]

166/3. Linum perenne L. subsp. anglicum (Mill.) Ockendon.—See 162. Tilia.

168.→Geraniaceae. Bortenschlager, S., 1967, Vorläufige Mitteilungen zur Pollenmorphologie in der Familie der Geraniaceen und ihre Systematisch Bedeutung, *Grana Palynol.*, **7**, 400-469. A palynological investigation of the Geraniaceae in the system adopted by Knuth largely confirms the findings of Hutchinson. A rearrangement of the genus *Geranium* is proposed.—[D.H.K.]

168.→Geraniaceae. Davis, P. H., 1967, Materials for a Flora of Turkey, 16. Geraniaceae, Linaceae, *Notes R. bot. Gdn. Edinb.*, **28**, 35-39. Taxonomic notes on *Geranium*, *Erodium* and *Linum* in Turkey, including the description of several new species and subspecies and a number of nomenclatural changes.—[D.H.K.]

168/7. Geranium sanguineum L. Leifertová, I. & Buckhová, H., 1968, K Chemotaxonomii znaku tríslovin u rodu Geranium—sledování tríslovin u druhu G. sanguineum L., 3, *Preslia*, **40**, 60-63.

168/8. Geranium macrorrhizum L. Poirion, L., 1968, Geranium macrorrhizum L. dans le préalpes de Grass, *Riviera scient.* **55**, 2. Notes on *Geranium macrorrhizum* in the Alpes-Maritimes where it reaches the western limit of its native range.—[D.H.K.]

169. Erodium. Guittonneau, G., 1966-67, Contribution à l'étude caryosystématique du genre Erodium L'Hérit, 3, *Bull. Soc. bot. Fr.*, **113**, 3-11. A caryological study, illustrated by figures showing metaphase, is given of 20 species of

Erodium occurring in the western Mediterranean region. The haploid number for *E. cicutarium* subsp. *bipinnatum* (Willd.) Tourlet (*E. glutinosum* Dumort.) is given as $n=10$; 4, *loc. cit.*, **114**, 32-41. Twenty-two species from Italy, Spain, Sicily and Tunisia are studied and chromosome numbers are given for some and confirmed for others studied in previous accounts.—(E.E.B.)

170. OXALIS. Schreiber, A., 1967, Die Gattung Oxalis L. in Südwestafrika, *Bot. Jb.*, **86**, 293-308. A revision of *Oxalis* in south-west Africa, based on a study of herbarium material at Berlin, Hamburg, Munich and Zürich. Sixteen species are recognised as well as a number of varieties. Among taxa which occur also in Britain are *Oxalis corniculata* and its var. *repens*, *O. incarnata*, *O. latifolia* and *O. pes-caprae*. A key is provided to the identification of the various species.—[D.H.K.]

170/3. OXALIS STRICTA L. Scholz, H., 1966, Oxalis dillenii Jacq. in Berlin, *Verh. bot. Ver. Prov. Brandenb.*, **103**, 50-53.

170/6. OXALIS ARTICULATA Savigny. McMillan, N. F., 1968, Allium triquetrum L. and Oxalis articulata Savigny in Co. Wexford, *Ir. Nat. J.*, **16**, 26.

171/4. IMPATIENS GLANDULIFERA Royle. Kilián, Z. & Seda, Z., 1967, K rozšíření Impatiens glandulifera Royle v purící Olse a Ostravice, *Zprávy Cesk. Bot. Spolecn. CSAV* **2**, 113-115. Notes on the introduction and historical spread of the Himalayan adventive *Impatiens glandulifera* along the river systems of Ostravia.—[D.H.K.]

173. ACER. Murray, E., 1967, A key to the cultivated maples, *Morris Arb. Bull.*, **18**, 43-47.

173. ACER. Powers, H. O., 1967, A blade tissue study of forty-seven species and varieties of Aceraceae, *Amer. Midl. Nat.*, **78**, 301-323. Experimental studies on the blade tissue of 47 species of the Aceraceae including *Acer campestre*, *A. pseudoplatanus*, *A. platanoides* and *A. monspessulanus* L.—[D.H.K.]

176/1. ILEX AQUIFOLIUM L. Knowles, E., 1967, Cultivars of British wild plants, 31. Holly and Spindle, *Gdnrs' Chron.*, **162** (27), 14. Details are given of some of the numerous cultivars of *Ilex aquifolium* and *Euonymus europaeus*.—[D.K.H.]

176/1. ILEX AQUIFOLIUM L. Peterken, G. & Lloyd, P. S., 1967, Ilex aquifolium L. (Biological Flora), *J. Ecol.*, **55**, 841-858.

177/1. EUONYMUS EUROPAEUS L.—See 176/1. ILEX AQUIFOLIUM L.

178/1. BUXUS SEMPERVIRENS L. Weniger, A., 1967, Die Buchsbestände am Dinkelberg, *Bauhinia*, **3**, 147-151. Phytosociological notes on *Buxus sempervirens* in Switzerland.—[D.H.K.]

181. → VITACEAE. Galet, P., 1967, Etude morphologique et systematique des plantules de Vitacées, *Naturalia monspel., sér. bot.*, **18**, 231-247. Studies in the germination and morphology of seedlings of various species of *Ampelopsis*, *Parthenocissus* and *Vitis*.—[D.H.K.]

181.→ VITACEAE. Galet, P., 1967, *Recherches sur les méthodes d'identification et des classification des Vitacées des zones tempérées. Thése présentée á la Faculté des Sciences de Montpellier pour obtentir le grade de Docteur des-Sciences Naturelles . . . Soutenue le* 24 *Juin* 1967 *devant la Commission d'examen.* Vol. 1. Pp. [ii] + 1-311; Vol. 2. Pp. [ii] + 312-526, including 67 plates. [Duplicated]. Montpellier. A revision of the species of the family Vitaceae found in the Temperate Zones of the world.—[D.H.K.]

183.→ LEGUMINOSAE. Gluch, W., 1967, Wuchformstudien an zentraleuropäischen Fabaceen, 1. Die Stauden der Gattungen Medicago L. und Trifolium L., *Feddes Rep.*, **76**, 221-265. Physiological studies on the root systems of a number of species of *Medicago* and *Trifolium*.—[D.H.K.]

183.→ LEGUMINOSAE. Jermyn, S. T., 1967, The Tri-Folinius or Clover family, *S. Essex Nat.*, **1966,** 5-17.

183.→ LEGUMINOSAE. Knowles, E., 1967, Cultivars of British wild plants, 23. The Pea family, *Gdnrs' Chron.*, **162** (12), 14. Cultivars of British species of the family Leguminosae include *Sarothamnus scoparius*, 'nana' and 'Peter Pan', both dwarf forms derived from subsp. *maritimus*, 'Diana' and 'Golden Sunlight', which have bright golden yellow flowers, with some of the petals primrose coloured in the former; 'Daisy Hill' and 'Sulphurea', with sulphur coloured flowers; 'Andreanus', which has a bronze keel and yellow standard; 'Firefly' with brownish-red standard, and a golden keel, and 'Fulgens', with clear-yellow flowers suffused with orange, and a deep maroon keel. Double-flowered forms of *Lotus corniculatus* and *Ulex europaeus* are sometimes grown, as is *U. gallii*, 'humilis', a prostrate form. *Hippocrepis comosa*, 'E. R. James', with more numerous lemon-coloured flowers than the native plant is also in cultivation.

The forms of *Anthyllis vulneraria* grown include 'Alba', with white flowers; 'Dillenii', with cream flowers tipped with red; 'Minor', with yellow flowers suffused with more red than most wild forms, this is invariably a rock garden plant, and 'Webbiana', with yellow flowers, a rapid growing cultivar for covering dry banks, etc. *Genista tinctoria*, 'Prostrata', a procumbent form; 'Plena', with six inch spikes of golden-yellow double flowers, and 'Royal Gold', with large single golden-yellow flowers are also sometimes seen. *Genista pilosa* is sometimes cultivated in gardens.—[D.H.K.]

184. LABURNUM. McClintock, D., 1967, Scotch Laburnum (Laburnum alpinum Presl) at Loch Lomond, *Glasg. Nat.*, **18,** 520-521. The author points out that Scotch Laburnum (*Laburnum alpinum* (Miller) Berchtold & J. Presl), so named because it was said to be grown and to flourish in the more fertile parts of Scotland formerly occurred commonly in the country, especially in Fife. The species is now apparently rare, and is seldom seen outside gardens. Prior to 1965 it was known to the author only in a side road near Jedburgh, and in 1965 two trees were seen by Loch Lomond, near Rose Priory, Gartocharn, Dunbarton.

L. alpinum differs from *L. anagyroides* by its general hairiness when mature, its darker, and often relatively broader leaflets, smaller flowers, opening 2-3 weeks later, and by having much thicker, stubbier ridges on its broad pods. Records of the species from Scotland are solicited.—[D.H.K.]

187. ULEX. Good, R. d'O., 1967, Botany, *Proc. Dorset nat. Hist. archaeol. Soc.*, **88,** 44-45. Contains notes on *Ulex gallii* and *U. minor*, with diagnostic characters for their separation.—[D.H.K.]

187/1. ULEX EUROPAEUS L. Tubbs, C. R. & Jones, E. L., 1964, The distribution of gorse (Ulex europaeus) in the New Forest in relation to former land use, *Pap. Proc. Hampsh. Fld Club*, **23,** 1-10.

190. MEDICAGO. Simon, J. P., 1967, Relationship in annual species of Medicago, 4. Interspecific graft affinities between selected species, *Aust. J. Bot.*, **15,** 75-82; 5. Analysis of phenolics by means of one-dimensional chromatographic techniques, *loc. cit.*, **15,** 85-93.

190. MEDICAGO. Simon, J. P. & Millington, A. J., 1967, Relationship in annual species of Medicago, 3. The complex M. littoralis Rhode—M. truncatula Gaertn., *Aust. J. Bot.*, **15,** 35-73.

191. MELILOTUS. Synnott, D. M., 1968, Melilotus spp. and Eriophorum latifolium in Co. Louth and Co. Meath, *Ir. Nat. J.*, **16,** 27. *Melilotus officinalis*, *M. alba* and *M. indica* are reported as new to Co. Meath, and a new locality for *Eriophorum latifolium* is recorded for the same vice county.—[D.H.K.]

192/4. TRIFOLIUM MEDIUM L. Fejer, S. O., 1967, Diallel crosses in Trifolium medium, *Can. J. Genet. Cytol.*, **9,** 799-804.

192/10. TRIFOLIUM STRIATUM L. Hendrych, R., 1967, Trifolium striatum in der Tschechoslowakei, *Preslia*, **39**, 276-286. Notes on the phytosociology and distribution of *Trifolium striatum* in Czechoslovakia.—[D.H.K.]

192/13. TRIFOLIUM SUBTERRANEUM L. Taylor, G. B. & Rossiter, R. C., 1967, Germination response to leaching in dormant seed of Trifolium subterraneum L., *Nature*, **216**, 389-390.

195. LOTUS. Chrtková-Zertová, A., 1967, The variability of the critical species of Lotus L. in Iran and in the neighbouring countries, 1. The circle of L. corniculatus L. and L. gebelia Vent., *Folia Geobot. Phyto-Taxon Bohem.*, **3**, 283-310. A revision of *Lotus corniculatus* L. *sensu lato* and *L. gebelia* Vent. in Iran, Iraq and Afghanistan. A number of new subspecies and varieties of *L. corniculatus* are described and illustrated, and a key is provided to the identification of all the taxa belonging to the collective species.—[D.H.K.]

195. LOTUS. Przywara, L. & Schmager, J., 1967, Badania cytotaksonomiczne nad gatunkami rodzaju Lotus L., *Acta biol. cracov., sér. bot.*, **10**, 113-126. Cytotaxonomical studies on *Lotus corniculatus* L. *sensu lato* in Poland have revealed the following chromosome numbers:—*L. tenuifolius* (L.) Reichb. $2n = 12$ (from 6 populations) and *L. corniculatus* L. *sensu stricto* $2n = 24$ (from 18 populations). The results of the study suggest that *L. tenuifolius* should be treated as a distinct species. In one locality in western Tatra, a tetraploid montane form morphologically distinct from *L. corniculatus* L. *sensu stricto* was found.—[D.H.K.]

195/3. LOTUS ULIGINOSUS Schkuhr. Thomas, R. G. & Forde, B. J., 1967, Flowering in Lotus pedunculatus Cav., 2. Minimal photoperiodic requirement for inflorescence initiation and development, *N.Z. J. Bot.*, **5**, 241-254.

199. COLUTEA. Browicz, K., 1967, A supplement to the monograph of the genus Colutea L., *Arb. Kórnick. Roczn.*, **12**, 33-43.

202/1. ORNITHOPUS PERPUSILLUS L. Craig, A. J., 1968, Ornithopus perpusillus L. in Co. Wicklow, H.20, *Ir. Nat. J.*, **16**, 26. A new locality, the second for the county, is reported from Co. Wicklow, and the distribution of the species in Ireland is reviewed.—[D.H.K.]

206. VICIA. Mettin, D. & Hanelt, P., 1968, Bemerkungen zur Karyologie und Systematik einiger Sippen der Gattung Vicia, *Feddes Rep.*, **77**, 11-30. Chromosome counts are given for a number of species of *Vicia*, including *V. tenuissima*, $2n = 14$; *V. benghalensis* L., $2n = 14$; *V. peregrina* L., $2n = 14$, and *V. lathyroides*, $2n = 12$.—[D.H.K.]

206/9. VICIA OROBUS DC. Mackechnie, R., 1967, Vicia orobus near Falls of Clyde, *Glasg. Nat.*, **18**, 521.

208.→ ROSACEAE. Edlin, H. L., 1967, A Modern Sylva, or a discourse of forest trees, 22. Rose Tribe Trees: Family Rosaceae, *Q. Jl. For.*, **61**, 189-197.

210. FILIPENDULA. Baker, H. G. and Baker, I., 1967, The cytotaxonomy of Filipendula (Rosaceae) and its implication, *Am. J. Bot.*, **54**, 1027-1034. The genus *Filipendula* Mill. is generally separated from *Spiraea* L. in systematic keys on the basis of a single fruit character. In some taxonomic treatments of the Rosaceae, where subfamilies are used, this places the genera in separate subfamilies. Karyological studies can be useful in assaying the justifiability of such treatment and are needed because of serious discrepancies between previous reports of chromosome numbers, and the recent textbook designation, on dubious grounds, of *F. vulgaris* as an example of a 'permanent chromosome hybrid'. The results given in this paper show that $x = 7$ in this genus (compared with $x = 9$ in *Spiraea*) and the reasons for rejecting previous counts of $2n = 15$ for *F. vulgaris* are presented. 'Permanent hybrid chromosome hybridity' for this species is also rejected. The possibility that a cytotype with $2n = 16$ may exist

in the northern part of the range of *F. ulmaria* cannot be completely discounted, but positive evidence is presented for $2n = 14$ in this species (even though $2n = 16$ has been reported mostly frequently recently). The basic number 7 for *Filipendula* is in agreement with the placing of this genus in the subfamily Rosoideae even though the hereditary peculiarities (apomixis and permanent chromosome hybridity) shown by other members of this subfamily are apparently not now needed to explain the cytological situations in *Filipendula*.—[Authors' summary]

211/6. RUBUS IDAEUS L. Jennings, D. L., 1967, Balanced lethals and polymorphism in Rubus idaeus, *Heredity*, **22**, 465-479.

212. POTENTILLA. Ingwersen, W., 1967, The genus Potentilla, *Gdnrs' Chron.*, **162** (12), 6. Among species of *Potentilla* suitable for the garden are various cultivars of *P. fruticosa*, *P. argentea* 'Calabrica', from Spain, which has intensely silver coloured deeply cleft leaves, and *P. recta* 'Warrensii' with rich yellow flowers.—[D.H.K.]

212/6. POTENTILLA ARGENTEA L. Asker, S., 1967, Induced sexuality after chromosome doubling in an apomictic Potentilla argentea-biotype, *Hereditas*, **57**, 339-342.

215. FRAGARIA. Darrow, G. M., 1966, *The Strawberry. History, Breeding and Physiology*. Pp. xvi + 3-447 + 20 plates. Published under the auspices of the New England Institute for Medical Research, New York, Chicago and San Francisco. Price $15.00. A comprehensive account of the history and origin of cultivated strawberries with extensive data on breeding experiments by Duchesne and others. A chapter on the wild strawberry species of the world is contributed by C. F. Reed.—[D.H.K.]

215. FRAGARIA. Evans, W. D. & Jones, J. K., 1967, Incompatibility in Fragaria, *Can. J. Genet. Cytol.*, **9**, 831-836.

215. FRAGARIA. Thompson, P. A., 1967, The history of the strawberry, *Gdnrs' Chron.*, **162** (22), 20-21; *loc. cit.*, **162** (23), 20-21.

217/1. DRYAS OCTOPETALA L. Anderson, D. J., 1967, Studies on structure in plant communities, 4. Cyclical succession in Dryas communities from north-west Iceland, *J. Ecol.*, **55**, 629-635.

217/1. DRYAS OCTOPETALA L. Evans, G. S., 1967, Dryas octopetala, *Q. Bull. alp. Gdnrs' Soc.*, **35**, 125-127. A popular account of *Dryas octopetala* and some of its allied species, with notes on their cultivation.—[D.H.K.]

220/t. ALCHEMILLA TYTTHANTHA Juz. Mackechnie, R., 1967, A Russian Lady's Mantle at Campsie, *Glasg. Nat.*, **18**, 521.

221/2. APHANES MICROCARPA (Boiss. & Reut.) Rothm. Kunz, H., 1966, Kleine Kritische Beiträge zur Flora von Basel und Umgebung, 4. Alchemilla (Aphanes) microcarpa Boissier et Reuter in Elsass, *Bauhinia*, **3**, 47-51.

222. SANGUISORBA. Nordborg, G., 1967, The genus Sanguisorba Section Poterium: Experimental studies and taxonomy, *Opera Bot.*, **16**, Pp. 166. A revision of *Sanguisorba* Section *Poterium* based on cytological, morphological, anatomical, palynological and ecological studies, with the addition of experimental crossings. Six species are recognised, four of which belong to the so-called *S. minor* complex. The species are *S. ancistroides* (Desf.) Ces., found in south-east Spain, Morocco and Algeria; *S. cretica* Hayek, endemic to Crete; *S. filiformis* (Hook. f.) Hand.-Mazz., found in the central and eastern Himalayas; *S. lateriflora* (Coss.) A. Br. & Bouché, from Spain; *S. vestita* (Pom.) Nordb., comb. nov., found in Morocco and Algeria, and *S. minor* Scop. The latter is the most variable species in the genus, and the following subspecies are recognised—subsp. *minor*, widespread in most parts of Europe from S. Scandinavia to N. Africa and the Canary Islands, south-west and central Asia; it occurs also as an established adventive

in the United States. This subspecies is chiefly confined to dry meadows, rocky slopes and cliffs, and is the only representative of the Section native in the British Isles. *S. minor* subsp. *lasiocarpa* (Boiss. & Hausskn.) Nordb., comb. nov., occurs from Turkey to Afghanistan, and also grows locally in Greece and Italy; *S. minor* subsp. *magnolii* (Spach) Nordb., comb. nov., is found in southern Europe, N. Africa and western Asia, while **S. minor** subsp. **muricata** (Spach) Nordb., comb. nov., occurs in south and central Europe (rarely even to Scandinavia), N. Africa and south-west Asia eastwards to Afghanistan; *S. minor* subsp. *rupicola* (Boiss. & Reut.) Nordb., comb. nov., is found in south-east Spain.

Full descriptions, synonymy, keys to the identification of species and subspecies, details of exsiccata seen, distribution maps and photographs are provided for all the taxa.—[D.H.K.]

222/2. SANGUISORBA CANADENSIS L. Lennie, J. M., 1967, Sanguisorba canadensis at Castle Semple Loch, *Glasg. Nat.*, **18,** 522.

225. ROSA. Klásterský, I., 1966, Klíc K urcení evropských druhu rodu Rosa, *Zprávy Cesk. Bot. Spolecn. CSAV*, **1,** 132-142. A key is provided to the identification of the European species of *Rosa*.—[D.H.K.]

225. ROSA. Nilsson, Ö., 1967, Drawings of Scandinavian plants, 5-6, Rosa, *Bot. Notiser*, **120,** 249-254; *loc. cit.*, **120,** 393-408. Excellent drawings and relevant text are provided for *Rosa rubiginosa*, *R. elliptica* Tausch subsp. *inodora* (Fr.) Schwertschl., *R. agrestis*, *R. micrantha*, *R. pimpinellifolia*, *R. majalis* Herrm., *R. acicularis* Lindley and the Scandinavian adventives *R. rugosa*, *R. camtschatica* Vent., *R. rubrifolia* Vill., *R. multiflora* Thunb., *R. pendulina* L., *R. virginiana* Mill., *R. marginata* Wallr. and *R. caryophyllacea* Bess. *R. camtschatica* Vent. (*R. rugosa* var. 'hollandica'), a native of north-eastern Asia, is frequently used as a stock for cultivated roses and is established as an escape and is locally naturalised in southern Sweden. It differs from *R. rugosa* in having ± glabrous prickles which are less abundant, particularly on the flowering branches on which they are often continued to a pair just below the leaves; in its narrower leaflets, which are ± broadly lanceolate and sparsely pubescent beneath, and less rugose; the pedicels are almost glabrous and often straight, the flowers smaller (*c.* 4-5cm. in diameter) and the sepals long, equalling the petals, and very narrow. The account concludes with a key to the identification of the Scandinavian *Rosa* taxa.—[D.H.K.]

226. PRUNUS. Kárpáti, Z. E., 1967, Taxonomische Betrachtungen am Genus, Prunus, *Feddes Rep.*, **75,** 47-53. Notes on the karyology of *Prunus domestica*, *P. insititia*, *P.* × *italica* Borkh. emend. Kárpáti (*P. domestica* × *insititia*) and *P.* × *syriaca* Borkh. emend. Kárpáti (*P. domestica* × *cerasifera*).—[D.H.K.]

226. PRUNUS. Suzka, B., 1967, Studia nad spoczynkiem kiekowanicm nasion róznych gatunków zrodzaju Prunus L., *Arb. Kórnick. Rocza*, **12,** 221-282. Studies on dormancy and germination in the seeds of a number of *Prunus* species, including *P. avium*, *P. cerasifera*, *P. mahaleb*, *P. padus* and *P. serotina*.—[D.H.K.]

226/m. PRUNUS MAHALEB L. Fabris, H. A., 1967, 'Prunus mahaleb' L. subespontáneo en la Sierra de la Ventana (Provincia de Buenos Aires), *Darwiniana*, **14,** 570-571. The S. European species *Prunus mahaleb* is reported to be regenerating and becoming naturalised in Argentina.—[D.H.K.]

228. PYRACANTHA. Egolf, D. R. & Dreschler, R. F., 1967, Chromosome numbers of Pyracantha [Rosaceae], *Baileya*, **15,** 82-88. Chromosome numbers are given for a number of species and cultivars of *Pyracantha*.—[D.H.K.]

231. AMELANCHIER. Favarger, C. & Correvon, P., 1967, Mise en évidence de 'races chromosomiques' chez l'Amélanchier, *Bull. Soc. Neuchât. Sci. nat.*, **90,** 215-218.

232. Sorbus. Kárpáti, Z., 1965, Geobotanische Betrachtung zur Taxonomie der europäischen Sorbus-Arten, *Drudea*, **5**, 67-74.

232/6. Sorbus latifolia (Lam.) Pers. Moor, M., 1967, × Sorbus latifolia (Lam.) Pers. in der Nordwestschweiz Fundorte und Soziologische Binding, *Bauhinia*, **3**, 117-131. Notes on the ecology and phytosociology of *Sorbus latifolia* in Switzerland.—[D.H.K.]

233. Pyrus. Zielinski, Q. B. & Thompson, M., 1967, Speciation in Pyrus: chromosome number and meiotic behaviour, *Bot. Gaz.*, **128**, 109-112. A survey of cytological studies on *Pyrus* by a number of workers in different parts of the world shows that all the species are diploid with $2n = 34$, though several cultivars and variants are triploid. The conclusion is reached that speciation in *Pyrus*, as in other genera of the Pomoideae, has occurred without a change in chromosome number.—[D.H.K.]

233/2. Pyrus cordata Desv. Wilson, M.A., 1967, Saving the Plymouth Pear, *J. Devon. Trust Nat. Conserv.*, **1**, 481-482.

235. Sedum.—See 239. Saxifraga.

239.→ Saxifragaceae. Gelius, L., 1967, Studien zur Entwicklungsgeschicte an Blüten der Saxifragales sensu lato mit besonderer Berücksichtigung des Androeceums, *Bot. Jb.*, **87**, 253-303. Studies in flower development in 12 species of the Saxifragaceae, including *Saxifraga hirsuta* and *Ribes nigrum*.—[D.H.K.]

239. Saxifraga. Knowles, E., 1967, Cultivars of British wild plants, 23. Rockfoils and stonecrops, *Gdnrs' Chron.*, **162** (11), 14. Among native species of *Saxifraga* in cultivation are *S. cespitosa*, *S. hypnoides*, various cultivars of *S. oppositifolia*, and *S. granulata*. The British species of *Sedum* grown in gardens include *S. acre* 'Aureum', in which the tips of the shoots are bright golden yellow in spring; 'Elegans' with leaves and stem tips of a silvery colour, and 'Majus', a large robust form. *S. telephium* 'Munstead' and 'Affine' have dark red and rose-pink flowers respectively, while 'Borderi' has red stems, greyish leaves and reddish-purple flowers, and 'Roseo-Variegato' has bright pink young leaves which later turn green. *Rhodiola rosea* is also in cultivation.—[D.H.K.]

239/11. Saxifraga rivularis L. Bunce, R. G. H. & Myerscough, P. J., 1967, Saxifraga rivularis on Beinn Eighe, *Trans. Proc. bot. Soc. Edinb.*, **40**, 321-324.

246. Ribes. Tamas, P., 1967, Einige physiologische und züchterische probleme der Befruchtung in der Gattung Ribes, 2. Eine Schnellemethode zur Ermittlung des Selbstkomptibitatsgrades bei Schwarzen Johannis beeren, *Zuchter*, **37**, 342-344. Studies in the physiology and breeding problems in the fertilisation of *Ribes nigrum* and allied species.—[D.H.K.]

249. Lythrum. Carbonell, J. B., [1965], 1967, Revision de las especies españolas del genero Lythrum L., *Anl. Inst. bot. A. J. Cavanillo*, **23**, 147-162. A revision of the Spanish species of *Lythrum*, with descriptions, synonymy, illustrations and keys. A number of species which also occur in Britain are included in the account. —[D.H.K.]

249/1. Lythrum salicaria L. Cheung, M. & Sattler, R., 1967, Early floral development of Lythrum salicaria, *Can. J. Bot.*, **45**, 1609-1618.

249/1. Lythrum salicaria L.—See 251. Daphne.

251. Daphne. Knowles, E., 1967, Cultivars of British wild plants, 26. Daphnes, Water-lilies and purple loosestrife, *Gdnrs' Chron.*, **162** (15), 14. Cultivars of *Daphne mezereum* are 'Plena', a double-flowered form with white flowers; 'Grandiflora', with large bright purple flowers, and 'Grandiflora Alba', with large white flowers. *D. laureola* is also sometimes grown in gardens.

Water-lilies grown in ornamental pools include hybrids of various European and American species with *Nymphaea alba*; *Nuphar lutea* is also in civilisation.

Among the numerous cultivars of *Lythrum salicaria* are 'Lady Sackville', with brilliant rose-pink flowers; 'Beacon', with deep rose-red flowers, and 'Pritchards', with medium rose-pink flowers; all these grow to a height of four feet. The smaller cultivars growing up to a height of two feet include 'Robert', with bright red flowers; 'Brightness', with rosy pink flowers; 'Rose Queen', with pale rose-pink flowers; 'Atro-purpureum', with deep purple flowers; 'Roseum Superba', with magenta flowers, and 'Marden's Pink', with deep rich pink flowers.—[D.H.K.]

252/1. HIPPOPHAE RHAMNOIDES L. Grigoroescu, E. & Bauer, E., 1967, Observatii în legâtura cu rasp îndirea plantei Hippophae rhamnoides pe litorallu Marii Negre, *Comm. Bot.*, **5**, 111-114. Studies on the increase and spread of *Hippophae rhamnoides* on the coasts of the Black Sea.—[D.H.K.]

253/1. LUDWIGIA PALUSTRIS (L.) Ell. Aston, H. I., 1967, Aquatic angiosperms. Records of four introduced species new to Victoria, *Muelleria*, **1**, 169-174. Four aquatic angiosperms are reported as adventives new to Victoria. These include *Ludwigia palustris* which was collected in 1964 from a lagoon on the Ovens River in north-east Victoria. The species is new to Australia, and reference is made to its earlier introduction and subsequent rapid spread in New Zealand.—[D.H.K.]

254. EPILOBIUM. Raven, P. H., 1967, A revision of the African species of Epilobium (Onagraceae), *Bothalia*, **9**, 303-333. Descriptions, synonymy, keys to the identification of species etc., and distribution maps are given in this revision of the species of *Epilobium* found in Africa. Ten species are recognised as native of which the following occur also in Britain—*E. hirsutum*, *E. parviflorum*, *E. lanceolatum*, *E. tetragonum* and *E. obscurum*. A record of *E. angustifolium* from Africa requires confirmation.—[D.H.K.]

254/6. EPILOBIUM ADENOCAULON Hausskn. Holub, J., 1966, Wový neofyt ceskoslovenské kveteny—Epilobium adenocaulon Hausskn. Predbezné, *Zprávy Cesk. Bot. Spolecn. CSAV*, **1**, 37-38. The occurrence of the North American species *Epilobium adenocaulon* as a recently established adventive in Czechoslovakia is reported, and notes are provided to distinguish it from such native Czech species as *E. montanum*, *E. obscurum*, *E. roseum* and *E. adnatum*.—[D.H.K.]

256/2. OENOTHERA ERYTHROSEPALA Borbás. Saito, M. & Yamaki, T., 1967, Retardation of flower opening in Oenothera lamarckiana caused by blue and green light, *Nature*, **214**, 1027.—[D.H.K.]

258. CIRCAEA. Jungblut, F., 1967, Le genre Circaea L. dans le Grande-Duché de Luxembourg, *Archs Inst. gr.-duc Luxemb., nouv. sér.*, **32**, 75-116. A cyto-taxonomical study of *Circaea* in Luxembourg has revealed the presence of *C. alpina*, which is new to the country. Descriptions, synonymy, ecological data and distribution maps are provided for *C. lutetiana* and *C. alpina*.—[D.H.K.]

259/2. MYRIOPHYLLUM SPICATUM L. Smith, G. E., Hall, T. F. and Stanley, R. A., 1967, Eurasian watermilfoil in the Tennessee Valley, *Weeds*, **15**, 95-98. Details are provided of the results obtained by the use of thirty-four different herbicides used in attempts to eradicate the adventive Eurasiatic species *Myriophyllum spicatum* in six reservoirs in the Tennessee valley under various ecological conditions between 1960 and 1965. The most effective herbicides were found to be butoxyethanol, 2-ethylhexanol and propylene glycol butyl ether (PGBE) esters of 2, 4-D in granular form.—[D.H.K.]

262. CALLITRICHE. Schotsman, H. D., 1967, *Les Callitriches espèces de France et taxa nouveaux d'Europe*. '*Flore de France*', **1.** Pp. 152 + 37 plates. Paris. A revision of the European and Mediterranean species of *Callitriche*, with particular emphasis on those found in France. Full descriptions, synonymy, illustrations of leaves, fruits, anatomical features, chromosome numbers, etc. are provided.

A new classification for the genus is proposed, viz.:—

Group I. Aquatic species. 1. *C. hermaphroditica* L., 2a. *C. truncata* Guss. subsp. *truncata*, 2b. *C. truncata* Guss. subsp. *occidentalis* Rouy, 2c. *C. truncata* Guss. subsp. *fimbriata* Schotsman, subsp. nov., 3. *C. pulchra* Schotsman, sp. nov., 4. *C. fassettii* Schotsman (North America).

Group II. Group occupying a rather intermediate position between the groups I and III. Semi-amphibious species. 1. *C. lusitanica* Schotsman, 2. Related taxa (ined.; North Africa).

Group III. Amphibious species. 1. *C. stagnalis* Scop., 2. *C. obtusangula* Le Gall., 3. *C. cophocarpa* Sendtn. (*C. polymorpha* Lönnr.), 4. *C. platycarpa* Kütz., 5. Hybrid [probably *C. cophocarpa* × *platycarpa*], 6. *C. palustris* L. (provisionally incorporated in this group), 7. *C. cribrosa* Schotsman (North Africa).

Group IV. Amphibious species. 1. *C. brutia* Pet. (*C. pedunculata* DC.), 2. *C. hamulata* Kütz. ex Koch, 3. *C. naftolskyi* Warb. & Eig.

Group V. Terrestrial species. 1. *C. terrestris* Raf. em. Torr., 2. *C. peploides* Nutt.

A new species, *C. pulchra* Schotsman, sp. nov., is described from Crete, it has a Mediterranean distribution, and *C. truncata* Guss. subsp. *fimbriata* Schotsman, subsp. nov., is described from the European U.S.S.R. where it had previously been known under the name *C. virens* Goldb. (= *C. hermaphroditica* L.). The name **C. brutia** Pet., *Institutiones Bot.*, **2**, 9 (1787), predates the name *C. pedunculata* DC., Lamarck & De Candolle, *Syn. Plant.*, 327 (1860).

C. stagnalis is probably common throughout Europe. *C. obtusangula* is chiefly in southern and western Europe, although it is present in some areas in central Europe. *C. cophocarpa* is rare in western Europe, and probably also rare in the Mediterranean region, though it is common in the other parts of Europe. *C. platycarpa* is mainly confined to western Europe, and a hybrid, probably *C. cophocarpa* × *platycarpa*, is recorded from France and Switzerland. *C. palustris* is usually found at fairly high altitudes, mainly in Arctic-Alpine regions. *C. brutia* is chiefly confined to the Atlantic and Mediterranean regions of Europe, while *C. hamulata* is most frequent in non-calcareous regions of north-western and Central Europe. *C. truncata* subsp. *truncata* is found in the Mediterranean region, subsp. *occidentalis* in Portugal, France, Belgium and England, and subsp. *fimbriata* is known from the European U.S.S.R. *C. hermaphroditica* is confined to western Europe with its southern limit across Great Britain, Germany and the Netherlands. *C. lusitanica* is confined to Portugal and Spain, and *C. naftolskyi* is recorded from Sardinia, though it is possible that it occurs also on the European mainland. Finally, two North American species, *C. terrestris* and *C. peploides* are known to have occurred as adventives in France.

Detailed accounts of the distribution of the various species in France are given, and extensive keys provided to the identification of species and subspecies, and attention is drawn to the great variability of the leaves and rosettes in different taxa. The work concludes with a comprehensive bibliography.—[D.H.K.]

263/1. VISCUM ALBUM L. Powden, C. C., 1967, Reflections on mistletoe, *Gdnrs' Chron.*, **162** (25), 15 & 23; *loc. cit.*, **162** (26), 14. Notes on *Viscum album*, including hosts, races, seed dispersal and physiology.—[D.H.K.]

269.→ UMBELLIFERAE. Cauwet, A. M., 1967, Contribution a l'étude caryologique de quelques ombellifères d'Espagne, *Naturalia monspel.*, *sér. bot.*, **18**, 201-209. Chromosome numbers are given for a number of Spanish species of the Umbelliferae, including *Ammi visnaga* Lam., $2n=22$, and *Smyrnium perfoliatum*, L. $2n = 22$.—[D.H.K.]

271/1. ASTRANTIA MAJOR L. Chisholm, D., 1967, Astrantia major in a new locality, *Glasg. Nat.*, **18**, 522. *Astrantia major* is reported to be well established on the roadside at Kennishead, Renfrewshire.—[D.H.K.]

283. Bupleurum. Shinners, L. H., 1967, Bupleurum lancifolium (B. subovatum) (Umbelliferae) in Texas, *Sida*, **3,** 185. Examination of North American herbarium specimens of *Bupleurum rotundifolium* at the Southern Methodist University, Texas, has revealed that two gatherings from Texas and one from North Carolina are referable to the south European adventive *B. lancifolium* Hornem. The differences between *B. rotundifolium* and *B. lancifolium* are described, and reference is made to the occurrence of the latter as a bird-seed introduction in England. The means of its introduction into North America is unknown.—[D.H.K.]

294. Pimpinella. Hunkeler, C. & Favarger, C., 1967, Contribution à la cytotaxinomique du genre Pimpinella L., *Bull. Soc. Bot. Neuchât. Sci. Nat.*, **90,** 219-239.

299/1. Seseli libanotis (L.) Koch. Nilsson, Ö., 1967, Seseli libanotis (L.) Koch (Umbelliferae) refound in Scania (South Sweden), *Bot. Notiser*, **120,** 487-488.

302/1. Foeniculum vulgare Mill. Raghavanshi, S. S. & Joshi, S., 1966, Foeniculum vulgare: polyploidy, translocation, heterozygosity and pollen variability, 1. Cytology, *Cytologia*, **31,** 43-58.

306/1. Ligusticum scoticum L. Brindley, B., 1967, The decorative Lovage, *Amateur Gard.*, **84** (4325), 33. Notes on the introduction of *Ligusticum scoticum* into Britain and its subsequent cultivation as a culinary herb.—[D.H.K.]

307. Angelica. Bolman, J., 1966, Engelwortel (Angelica sylvestris L.) en Grote (of Echte) Engelwortel (Angelica archangelica L.), *Natura*, **63,** 127-130.

307. Angelica. Constance, L., 1967, The mysterious cultivated Angelica of New Zealand, *N.Z. J. Bot.*, **5,** 447-449. A review of the species of *Angelica* grown in New Zealand gardens has revealed that the plant most commonly cultivated is not the Eurasian *A. archangelica* but a plant probably referable to *A. pachycarpa* Lange, originally described from Spain in 1864. Although more widely grown than the culinary species it is apparently chiefly valued for its handsome glossy foliage. Its date of introduction and history in New Zealand is unknown. A description and illustration of *A. pachycarpa* is provided.—[D.H.K.]

314/1. Daucus carota L. Joshi, S. & Raghavanshi, S. S., 1967, Artificial induction of pollen variability in Daucus carota, *Phyton*, **12,** 31-34.

318.→ Euphorbiaceae. Webster, G. L., 1967, The genera of Euphorbiaceae in the Southeastern United States, *J. Arnold Arbor.*, **48,** 303-361. A detailed analysis of the family Euphorbiaceae in the southeastern United States with a key to the identification of the genera.—[D.H.K.]

319/15. Euphorbia esula L. McIntyre, G. I. & Raju, M. V. S., 1967, Developmental studies on Euphorbia esula L., 1. Some effects of the nitrogen supply on the growth and development of the seedling, *Can. J. Bot.*, **45,** 975-984.

319/15. Euphorbia esula L. Mitich, L., 1966, Control of leafy spurge, *Biokemia*, **1966** (13), 7-8. About 300,000 acres, including much arable and pasture land, in North Dakota, U.S.A. are infested by *Euphorbia esula*. Various herbicides have been used experimentally in different areas in attempts to eradicate the plant, and consistently good control has been given by a single application of 2 lbs. per acre of Tordon 22K (Picloram). Seedling regeneration was eliminated and rhizome regrowth retarded by 95% by this method.—[D.H.K.]

320. Polygonum. de Kam, M., 1967, Polygonum clinode Michx. een nieuwe aanwist voor de Nederlandse flora ?, *Natura*, **64,** 85. The discovery in the Netherlands of *Polygonum clinode* Michx., a North American species closely related to *P. convolvulus* is reported. A description and illustration of this new adventive are provided.—[D.H.K.]

320/10. POLYGONUM LAPATHIFOLIUM L. Hammerton, J. L., 1967, Studies on weed species of the genus Polygonum, 4. Variations in seed weight and germination behaviour in P. lapathifolium, *Weed Res.*, **7** (1), 1-21.

320/19. POLYGONUM CUSPIDATUM Sieb. & Zucc. Harper, C. W. & Stott, K. G., 1967, The control of Japanese Knotweed, Polygonum cuspidatum Sieb. & Zucc., *Ann. Rep. Long Ashton Agric. & Hort. Research Stat.*, **1966**, 268-276. *Polygonum cuspidatum* was introduced into Britain as a garden plant in 1825. It has escaped and is now frequent in many places, often forming dense stands. A large clump which grew annually to a height of eight feet was not controlled by 2, 4, 5—T/2, 4: D mixture applied in water or diesel oil, and single sprays of bromacil at 16 lb/acre were not effective; that at 24 lb./acre, however, severely weakened the plant and when repeated the following year gave complete control. A single foliar spray of Picloram as the K salt at 3 lb. a.e./225 gal./acre or preferably 300 gal./acre applied in June also gave complete control.—[D.H.K.]

325. RUMEX. Berton, A., 1968, Observations sur les Rumex maritimus L. et R. palustris Sm., *Monde des Plantes*, **358**, 14-15. Notes on *Rumex maritimus* and *R. palustris*, and on the diagnostic characters separating them.—[D.H.K.]

325/4. RUMEX HYDROLAPATHUM Huds. Wells, T. C. E., 1966, Studies on the Great Water Dock (Rumex hydrolapathum), *Rep. Monks Wood Exp. Stat.*, **1960-1965**, 21-22.

325/6. RUMEX CONFERTUS Willd. Jehlík, V. & Kopecký, K., 1967, Rumex confertus Willd.—nová adventivní rostlina v Cechach, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2**, 172-175. The eastern European species *Rumex confertus* was discovered as an adventive new to the Czechoslovak flora in 1965. A description of the plant is provided and its extra-European distribution is reviewed.—[D.H.K.]

330. ULMUS. Knowles, E., 1968, Cultivars of British wild plants, 38. Elms, *Gdnrs' Chron.*, **163** (4), 20. Cultivars of British elms seen in parks and gardens, etc., include *Ulmus procera* 'Vanhouttei', with leaves suffused with yellow; 'Argenteo variegata', with leaves conspicuously blotched and margined creamy white; much less common is 'Viminalis' which is slow growing with a slender habit and very narrow leaves which are superficially very 'un-elm' like in appearance. Other elms in cultivation are *U. stricta*, the Cornish Elm, *U. sarniensis*, the Jersey Elm, and its cultivar 'Wheatleyi Aura', which has golden leaves. Other cultivars include *U. glabra* 'Cornuta', which has one or two lobes to each leaf; 'Pendula', with spreading pendulous branches, and 'Exoniensis', with erect branches which form a narrow columnar head, and leaves which are curiously puckered and twisted. *U. carpinifolia* 'Webbiana', a columnar tree with small rounded leaves; 'Suberosa', with a low spreading habit and branches with corky wings; 'Pendula', with slender hanging branchlets, and 'Variegata', with leaves spotted with white are also grown.—[D.H.K.]

330. ULMUS. Mitchell, A. F., 1967, A quick way to recognize the elms of England, *Timber Trade J.*, **260**, supplement 'Forestry and Home-Grown Timber', 20-21. Non-technical descriptions and a key to the identification of the following:—*Ulmus procera*, *U. carpinifolia* and its varieties *cornubiensis* and *sarniensis*, *U. plotii*, *U.* × *hollandica* and its varieties *hollandica* and *vegeta*, and *U. glabra*. A number of drawings are also provided.—[D.H.K.]

330. ULMUS. Richens, R. H., 1967, Studies on Ulmus, 7. Essex elms, *Forestry*, **40**, 185-206. A biometrical study of the elm flora of Essex based on a collection of nearly 500 leaf samples from every ancient parish in the county. Most of the elms could be assigned to one of nineteen groups—9 of *Ulmus carpinifolia*, 1 of *U. glabra*, 2 of *U. procera*, 3 of putative F_1 *U. carpinifolia* × *glabra*, 3 of *U. carpinifolia* with suspected introgression from *U. glabra*, and 1 of *U. carpinifolia* × *procera*. The history and spread of the various taxa in the county is given.—[D.H.K.]

335.→ BETULACEAE. Endress, P. K., 1967, Systematische Studie über die verwantschaftlichen Beziehungen zwischen den Hamamelidaceen und Betulaceen, *Bot. Jb.*, **87**, 431-452. Vegetative characters, structure of inflorescences and flowers in several genera of the Hamamelidaceae and Betulaceae are compared. Life form, ramification, phyllotaxis, anatomy of stems and leaves and development of buds are also studied.—[D.H.K.]

335. BETULA. Boivin, B., 1967, Notes sur les Betula, *Naturaliste can.*, **94**, 229-231. Studies on North American birches, including the creation of varietal ranks for the American representatives of *Betula nana*, together with a key to their identification.—[D.H.K.]

335. BETULA. Elkington, T. T., 1968, Introgressive hybridization between Betula nana L. and B. pubescens Ehrh. in north-west Iceland, *New Phytol.*, **67**, 108-118. In Iceland the genus *Betula* is represented by *B. nana* L., which shows little morphological variation and a variable series of shrub and tree birches. A comparison of these variable populations with British populations of *B. pubescens* ($2n = 56$) and *B. nana* ($2n = 28$) using histograms of hybrid indices has led to the conclusion that the variable Icelandic populations are the result of introgression between *B. pubescens* and *B. nana*.—[D.H.K.]

335. BETULA. Natho, G., 1967, Zum Problem der Introgressiven Hybridisation, *Feddes Rep.*, **75**, 55-60. The author stresses the difficulties involved in determining whether or not introgressive hybridisation is taking place in populations of allied species and uses *Betula pendula* and *B. pubescens* as the chief examples for his study.—[D.H.K.]

335/3. BETULA NANA L. Souchon, C., 1967, Etude biogéographique d'une espèce boréo-arctique (Betula nana L.) en un point limite de son aire, *C. r. Somm. Seanc. Soc. Biogéogr.*, **43**(377-379), 121-127. The distribution of *Betula nana* covers two main areas: northern, of which N. England and S. Norway are the southern limits, and a somewhat distinct area comprising several alpine localities. In addition the species is found in one or two localities in N. Germany and Poland and in an isolated station to the S. and W. of its main areas. An ecological and phytogeographical account of its occurrence in the latter, in Haute-Margeride, is given.—[E.B.B.]

336. ALNUS. Schalin, I., 1967, Germination analysis of Alnus incana (L.) Moench and Alnus glutinosa (L.) Gaertn. seeds, *Oikos*, **18**, 253-260.

337/1. CARPINUS BETULUS L.—See 338/1. CORYLUS AVELLANA L.

338/1. CORYLUS AVELLANA L. Bradbeer, J. V. & Pinfield, N. J., 1967, Studies in seed dormancy, 3. The effects of gibberellin on dormant seeds of Corylus avellana, *New Phytol.*, **66**, 515-523.

338/1. CORYLUS AVELLANA L. Knowles, E., 1968, Cultivars of British wild plants, 39. Hazel & Hornbeam, *Gdnrs' Chron.*, **163** (6), 16. Cultivars of *Corylus avellana* include 'Laciniata', which has small deeply lobed leaves with acute teeth; 'Purpurea', with leaves suffused with purple; 'Aurea', in which the young shoots and leaves are yellowish. 'Pendula', a weeping mutant and 'Contorta', a curious form with shoots curled and twisted in a fantastic manner, are also cultivated. The latter plant originated in a hedgerow in Gloucestershire in 1863.

The cultivars of *Carpinus betulus* include 'Asplenifolia', with attractive deeply lobed leaves; 'Incisa', with smaller leaves possessing only six pairs of lateral veins; cu. 'Purpurea', in which the young leaves are purple coloured; 'Pendula', a weeping form; 'Columnaris', which has a slender spire-like habit when young; 'Pyramidalis', broadly pyramidal in outline, and 'Fastigiata', which has a compact pyramidal growth habit.—[D.H.K.]

339/1. Fagus sylvatica L. Galoux, A., 1966, The genetic/ecological variability of Fagus sylvatica in Belgium, *Trav. Stn. Rech. Groenendael. Sér. A*, **11.** Pp. 21 + 2 maps. Studies on *Fagus sylvatica* in Belgium have shown that local races can be recognized on the basis of ecological, phenological and morphological variability. The factors which may be responsible for the variation are discussed. —[D.H.K.]

339/1. Fagus sylvatica L. Knowles, E., 1967, Cultivars of British wild plants, 31. The Beech, *Gdnrs' Chron.*, **162** (21), 14. A number of cultivars of *Fagus sylvatica* are described.—[D.H.K.]

341. Quercus. Dizerbo, A.-H., 1965, Les chênes du Finistère, *Penn ar Bed*, **5.**, 140-142.

341. Quercus. Djavanchir-Khoie, K., 1967, *Les chênes de l'Iran. Thêse Fac. Sci. Montpellier.*, Pp. 221. A revision of *Quercus* in Iran, with descriptions, synonymy keys to the identification of species and varieties and many illustrations of leaves, fruits, etc.—[D.H.K.]

341. Quercus. Liger, J., 1967, Le chêne pubescent en Basse-Seine, *Revue Socs sav. hte Normandie*, **43,** 23-26. An account is given of *Quercus lanuginosa* in a number of stations in the Basse-Seine. In one of these, at Saint-Adrien, its relationship to *Q. petraea* and *Q. robur* is discussed and reference made to the problem of hybridity.—[D.H.K.]

341/4. Quercus petraea (Mattuschka.) Liebl. Jovancevic, M., 1966, Mountain pedunculate oak—a distinct race, *Sumarstvo*, **19** (3/5), 3-15. The author describes localities in Jugoslavia where *Quercus petraea* occurs as a mountain race showing distinct morphological and phenological characters which are quite different from the lowland race in that country. The name *Q. pedunculata* subsp. *montana* is proposed for the alpine race.—[D.H.K.]

342. Populus. Brayshaw, T. C., 1965, Native poplars of southern Alberta and their hybrids, *Dept. Forestry Publ.* (*Canada*), **1109, 1-40.**

342. Populus. Knowles, E., 1968, Cultivars of British wild plants, 37. Poplars, *Gdnrs' Chron.*, **163** (3), 9. Details are given of the cultivars of *Populus canescens*, *P. nigra* and *P. tremula*.—[D.H.K.]

342/3. Populus tremula L. Rowley, J. R. & Erdtman, G., 1967, Sporoderm in Populus and Salix, *Grana Palynol.*, **7,** 517-567. Palynological studies on *Populus tremula*, its f. *gigas*, and on *Salix humilis*.—[D.H.K.]

342/14. Populus nigra L. Bugula, W., 1967, Systematyska eurozjatyckich topoli z grupy Populus nigra L., *Arb. Kórnick. Roczn.*, **12,** 45-219. Taxonomic studies on the Euro-Asiatic poplars of the *Populus nigra* group. *P. nigra* L. subsp. *nigra* is found from western Europe, through central, eastern and south-eastern Europe as far east as western Siberia and the Caucasus, while its northern boundary appears to be the coasts of the North and Baltic Seas. It does not occur as a native species in north-western France or the British Isles, where it is replaced by **P. nigra** L. subsp. **betulifolia** (Pursh) W. Wettst. (*P. betulifolia* Pursh), which differs from subsp. *nigra* in having a delicate and caducous pubescence on the petioles, inflorescence and young shoots. On the European mainland *P. nigra* subsp. *betulifolia* occurs from Normandy to the Pyrenees.

P. nigra cv. *italica* is believed to be a mutation of subsp. *nigra* which originated probably in northern Italy in the late seventeenth or early eighteenth century. It is now commonly planted throughout Europe.—[D.H.K.]

343. Salix. Knowles, E., 1968, Cultivars of British wild plants, 41. Willows, *Gdnrs' Chron.*, **163** (10), 13. A few of the many forms of *Salix* in cultivation are described.—[D.H.K.]

344.→ Ericaceae. Knowles, E., 1967, Cultivars of British wild plants, 33, *Gdnrs' Chron.*, **162** (23), 14-15. Native British species of the Ericaceae which are grown in rock gardens include *Ledum palustre*, *Arctostaphylos uva-ursi*, *A. alpina*, and its cultivar 'Rubra', with pink florets, *Andromeda polifolia*, and its cultivars 'Minima', a decumbent and almost prostrate plant with short linear leaves and small flowers; 'Compacta', a round cushion of *c.* 9″ high with dark green leaves and pale pink flowers, and 'Nana', which is similar to the latter but has bright rose coloured flowers. All these cultivars, however, may be of foreign origin. Other species in cultivation include *Vaccinium myrtillus*, and its cultivar 'Alba', which has white berries; *V. vitis-idaea*, and its cultivar 'Minus', a dwarf form; *Erica cinerea*, *E. tetralix*, *E. vagans* and *E. hibernica*, all of which have a number of attractive cultivars. *Empetrum nigrum* is also sometimes grown in gardens.—[D.H.K.]

348/1. Phyllodoce caerulea (L.) Bab. McBeath, R., 1967, Phyllodoce caerulea (L.) Bab. on Ben Alder (v.c.97), *Trans. Proc. bot. Soc. Edinb.*, **40**, 335-336.

355/1. Arctous alpinus (L.) Nied. Stirling, A. McG., 1967, Arctous alpinus in Argyll, *Glasg. Nat.*, **18**, 523. The discovery of *Arctous alpinus* in Argyll in 1966 represents the most southern British locality in which it has so far been found. —[D.H.K.]

356/1. Calluna vulgaris (L.) Hull. Knowles, E., 1967, Cultivars of British wild plants, 35. Heather or Ling, *Gdnrs' Chron.*, **162** (25), 14. Descriptions are given of some of the numerous cultivars of *Calluna vulgaris*.—[D.H.K.]

357. Erica. Palser, B. F. & Murty, Y. S., 1967, Studies of floral morphology in the Ericales, 8. Organography and vascular anatomy in Erica, *Bull. Torrey bot. Club*, **94**, 243-320.

359.→ Pyrolaceae. Krísa, B., 1967, Príspevek k urcovaní a rozšírení ceskoslovenských druhu celedi Pyrolaceae (hruštickovité), *Zprávy Cesk. Bot. Spolecn. CSAV*, **2**, 209-221. Studies on the distribution of Czech species of the Pyrolaceae. —[D.H.K.]

359. Pyrola. Krísa, B., 1966, Bemerkung zu den neotropischen Arten der Gattung Pyrola L. s.str., *Nov. Bot. Hort. Bot. Univ. Prag.*, **1966**, 43-46. A revision of the Central American species of *Pyrola*.—[D.H.K.]

364/1. Empetrum nigrum L.—See 344.→ Ericaceae.

365. Limonium. Kunkel, G. & Sunding, P., 1967, Enumeration of species of Limonium Mill. (Plumbaginaceae) in the Canary Islands, with nomenclatural notes, *Cuad. Bot.*, **2**, 9-18. A review of the twenty species of *Limonium* found in the Canary Islands seventeen of which are endemic. Full synonomy is provided and a number of new combinations are made.—[D.H.K.]

365. Limonium.—See 475. Campanula.

366. Armeria. Lefèbvre C., 1967, Etude de la position des populations d'Armeria calaminaires de Belgique et des environs d'Aix-la-Chapelle par rapport à des types alpins et maritimes d'A. maritima (Mill.) Willd., *Bull. Soc. r. Bot. Belg.*, **100**, 213-224. Populations of *Armeria* on metalliferous soils have been studied and the distribution of the characters attributed by various authors to *A. maritima* and *A. alpina* noted. The characters in the populations studied appear to be somewhat intermediate.—[E.B.B.]

366. Armeria.—See 475. Campanula.

366/1. Armeria maritima (Mill.) Willd. Pourchet, R. & Gorenflot, R., 1967, La fasciation en éventail des rosettes d'Armeria maritima (Mill.) Willd., *C. r. Acad. Sci. Paris*, **265**, 115-118.

367. Primula. Cain, R. B., 1967, The genus Primula, a review of its diversity and origin, *Q. J. alp. Gdn. Soc.*, **35**, 128-171.

367. **Primula.** Hansen, L., 1967, Primula-arternes udbredelse på Samsø, *Flora Fauna Silkeborg*, **73**, 131-134. An account of *Primula elatior*, *P. vulgaris*, *P. veris*, and hybrids between them at Samsø, Denmark.—[D.H.K.]

367/2. **Primula scotica** Hook. Bullard, E. R., 1967, Primula scotica Hook., *Bull. Orkney Fld Club*, **4**, 4-5. Studies on populations of *Primula scotica* in five fixed one metre quadrats in the Orkneys. The populations have been under observation in the five localities for three years, and notes are provided on flowering, seed production, etc.—[D.H.K.]

372. **Anagallis.** Sverepová, G., 1966, Zur Unterscheidung der Taxa Anagallis arvensis L. und A. caerulea Nathh., *Nov. bot. Hort. Bot. Univ. Prag.*, **1966,** 65-75. Statistical studies on the capsules and seeds of *Anagallis arvensis* and *A. caerulea* in Czechoslovakia.—[D.H.K.]

372. **Anagallis.** Sverepová, G., 1967, Hybridisace našich druhu rodu Anagallis, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2,** 70-73. An account of the Czechoslovakian species and hybrids of *Anagallis*. Taxa reported from the country, with details of localities, etc., are *A. arvensis* f. *arvensis*, f. *azurea* Hyl., f. *carnea* (Schrank) Schinz & Thell., f. *lilacina* Alefeld, f. *pallida* Hook. f., f. *decipiens* Uechtr., f. *vinacea* Marsden-Jones, *A. caerulea* and *A.* × *doerfleri* Ronn. i, (*A. arvensis f. arvensis* × *caerulea*).—[D.H.K.]

372/2. **Anagallis arvensis** L. Kollman, F. & Feinbrun, N., 1968, A cytotaxonomic study in Palestinian Anagallis arvensis L., *Notes R. bot. Gdn. Edinb.* **28,** 173-186. Four infraspecific taxa of *Anagallis arvensis* L. from Palestine are treated: 1. Subsp. *arvensis* L. var. *arvensis*; 2. Subsp. *arvensis* L. var. *caerulea* (L.) Gouan; 3. Subsp. *arvensis* L. var. *latifolia* (L.) Lange and 4. Subsp. *foemina* (Mill.) Schinz & Thell.

The controversial nomenclature of these taxa is discussed, and *A. caerulea* L. is typified by B. L. Burtt in an appendix to the paper.

The infraspecific variability and the reliability of diagnostic characters in *A. arvensis* have been studied on Palestinian plants, both in the herbarium and in the field.

The distribution and ecological requirements of the four taxa in Palestine are examined. The following chromosome numbers have been found in eastern Mediterranean plants, var. *arvensis*, $n = 20$; var. *caerulea*, $n = 20$; var. *latifolia*, $n = 40$, and subsp. *foemina*, $n = 20$.

Chromosome numbers for the whole genus are brought together. It is concluded that all infraspecific taxa of *A. arvensis* are tetraploids, except var. *latifolia* which is an octoploid.

Data from the literature on spontaneous and experimental crosses within *A. arvensis* which demonstrated the genetical isolation of the two subspecies are discussed.—[Authors' summary].

375. **Buddleja.** Norman, E. M., 1967, The genus Buddleja in North America, *Gentes Herb.*, **10,** 47-114. A revision of the North and Central American species of *Buddleja* with descriptions, synonymy and keys to the identification of species, and details of geographical range and cytology.—[D.H.K.]

375/1. **Buddleja davidii** Franch. Fornaciari, G., 1967, Insediamento e diffusione de Buddleja davidii Franch., *G. bot. ital.*, **101,** 281-284. Plant associations in which *Buddleja davidii* is naturalised in northern Italy are described, and the phases of colonisation of the species over eighteen years are reviewed.—[D.H.K.]

376/1. **Fraxinus excelsior** L. Reeves, R. J. C., 1966, Cattle poisoning from ash leaves and fruits, *Vet. Rec.*, **79,** 580. Two cows that had eaten leaves and fruits of *Fraxinus excelsior* were found to be in a state of collapse with abdominal pain. Clinical symptoms are described. Both animals recovered uneventfully after treatment with calcium borogluconate and gastro-intestinal purgatives.—[D.H.K.]

384. Gentiana. Taylor, A. W., 1967, European spring Gentians, *Jl. R. hort. Soc.*, **92**, 425-429.

389.→ Boraginaceae. Fürnkranz, D., 1967, Einige neue Boraginaceen-Chromosomenzahlen, *Ost. bot. Z.*, **114**, 341-345. Chromosome numbers are given for a number of species of the Boraginaceae, including *Anchusa officinalis* L., $2n = 16$, $n = 8$.—[D.H.K.]

389/1. Cynoglossum officinale L.—See 400. Myosotis.

392. Symphytum. Gadella, T. W. J. & Kliphuis, E., 1967, Cytotaxonomic studies in the genus Symphytum, 1. Symphytum officinale L. in the Netherlands, *Proc. K. ned. Akad. Wet.*, **70**, 378-391. Plants from seventy-two populations of *Symphytum officinale* in the Netherlands were examined cytologically and morphologically. It was found that two populations contained 41 diploid plants, $2n = 24$, fifteen populations contained 129 plants with $2n = 40$, forty-eight populations had 294 tetraploids, $2n = 48$, three populations consisted of a mixture of diploids and tetraploids, and four populations possessed plants with differing chromosome numbers varying between $2n = 40$ and $2n = 48$. Mixed populations were, therefore, found to be rare.

Little morphological variation was noted between diploid and tetraploid plants except that all diploids were white-flowered, while the majority of tetraploids had light or dark purple or red-purple corollas; white-flowered specimens were, however, found.

The plants with $2n = 40$, showed distinct morphological, ecological and phenological differences to the other two races. It was less tall, with stems and leaves prickly (the diploids and tetraploids had densely hispid, never scabrous, stems and leaves), the hairs were also found to be deciduous (persistent in the other two races), and upper stem leaves not, or hardly, decurrent (usually decurrent in the diploids and tetraploids). It invariably grew under very moist conditions on peaty soils; and always in the open, while the other two races were found in drier places, e.g. roadsides, near woods, ditches, river and pond sides, etc., but never on peaty soils, they were also found to be tolerant of light shade. The flowering period was also noted to be shorter, and it was invariably in fruit in September when the other two cytotypes were still in flower.

It is concluded that the Dutch plant with $2n = 40$ closely matches *S. uliginosum* Kern., a native of southern Russia and Hungary, which is naturalised in Austria, France and Switzerland, and it is suggested that the species may in fact be native in the latter countries, in Holland, and possibly elsewhere in western Europe.—[D.H.K.]

392. Symphytum. McClintock, D., 1968, Symphytum leonhardtianum Pugsley and S. tuberosum L., *Ir. Nat. J.*, **16**, 21-22. *Symphytum leonhardtianum* was described by Pugsley from central Europe, and was said to differ from *S. tuberosum* in its slender rootstock with fewer and longer branches; in its shorter and less branched stems, with fewer and broader leaves, which increase in size upwards, nearer to the top of the stem. It was said also to have more conspicuous flowers, with shorter and more strongly ciliate calyx lobes and broader, more brightly coloured corollas and smaller and paler nutlets than *S. tuberosum.*

In the *Flora of the North-East of Ireland*, edition 2 (1938) all the tuberous comfrey records are attributed to *S. leonhardtianum*, although *S. tuberosum* is reported from elsewhere in Ireland. The author gathered and examined material from three localities in north-east Ireland, and considered that they come within the range of variation shown within *S. tuberosum.* A subsequent examination of herbarium material of *S. tuberosum* and *S. leonhardtianum* from Europe has led him to the conclusion that the latter should be treated as a synonym of *S. tuberosum.*—[D.H.K.]

392/1. SYMPHYTUM OFFICINALE L.—See 400. MYOSOTIS.

399/1. PULMONARIA LONGIFOLIA (Bast.) Bor.—See 400. MYOSOTIS.

400. MYOSOTIS. Grau, J., 1967, Cytotaxonomische Bearbeitung der Gattung Myosotis, 2. Myosotis sicula s.l., *Mitt. bot. StSamml., Münch.*, **6**, 517-530. Cytotaxonomic studies on *Myosotis sicula sensu lato* have shown that three species are involved, viz. *M. sicula* Guss., *sensu stricto*., a tetraploid, with $2n = 48$, whose range extends from Greece and Jugoslavia through Italy and France to the Channel Islands. *M. debilis* Pomel, a tetraploid, with $2n = 48$, found in the Iberian peninsula and North Africa, and *M. lusitanica* Schuster, a diploid, with $2n = 24$, known only from Portugal. Descriptions of the species, together with synonymy, and a key to their identification are provided.—[D.H.K.]

400. MYOSOTIS. Knowles, E., 1968, Cultivars of British wild plants, 42. Forget-me-not, lungwort and Comfrey, *Gdnrs' Chron.*, **163** (11), 9. British species of *Myosotis* in cultivation include *M. alpestris* 'Royal Blue', early flowering, up to a foot tall, with bright blue flowers; 'Stricta', similar to 'Royal Blue', but with a more erect habit; 'Marina', which produces numerous, 6-8 in. sprays with bright-blue flowers, and 'Blue-Ball', a very free compact plant of about the same height as 'Marina', but with bright indigo flowers. The deepest blue flowers, however, are found in the cultivar 'Blue Bouquet', which grows up to 15 inches in height; 'Victoria', is also tall, up to a foot or more, with an unusual monstrous growth of flattened branched stems and crowded blue flowers; 'Rosea', has delicate rose coloured flowers and grows to approximately six inches in height. All these cultivars are probably of Continental origin. *M. scorpioides* 'Semperflorens', grows to six to eight inches tall, has a neat habit and is a prolific producer of flowers, while 'Alba' and 'Rosea' have white and pink flowers respectively.

Pulmonaria longifolia 'Munstead Blue', is dwarfer than the wild plant with flowers of a more intense blue.

Cynoglossum officinale 'Bicolor', has white flowers with a purple throat, and 'Rosea' bears pink flowers.

Symphytum officinale 'Purpureum', has purple flowers; 'Ochroleucum', white or yellowish-white flowers, and 'Coccineum' has crimson flowers; 'Argenteum' has creamy marginal variegation on the leaves and produces purple flowers.—[D.H.K.]

405. CONVOLVULUS. Sa'ad, F., 1967, *The Convolvulus species of the Canary Islands the Mediterranean Region and the Near and Middle East.*, Pp. 288. Rotterdam. A revision of *Convolvulus*, including *C. arvensis* and its varieties. A number of other species included in the account have occurred as adventives in the British Isles.—[D.H.K.]

405/1. CONVOLVULUS ARVENSIS L. Phillips, W. M., 1967, Field bindweed and its control, *U.S. Dept. Agric. Leafl.*, **496**, 1-8. Directions are given for controlling large and small infestations of *Convolvulus arvensis* in both humid and dry areas of North America. The basic treatment is by the use of 2,4-D (2,4-dichlorophenoxyacetic acid), the quantity and usage depending upon the size of the infestation and the humidity or dryness of the area.—[D.H.K.]

406/1. CALYSTEGIA SEPIUM (L.) R. Br. Urban, I., 1966, Die Frühstadien der Adventivwurzelbildung bei Calystegia sepium (L.) R. Br., *Flora, Abt. B*, **156**, 388-394. Studies on the early stages of root initiation in *Calystegia sepium.* —[D.H.K.]

407. CUSCUTA. Baloch, G. M., 1968, Possibilities for biological control of some species of Cuscuta, *PANS*, **14**, 27-32. Notes on various insects which attack *Cuscuta* species in Pakistan. The larvae of the small fly *Melangromyza cuscutae* bores into

the stems of the plants as does the weevil *Smicronyx cuscutae*. The possibilities of utilising these and other insects as a means of biological control is discussed.—[D.H.K.]

408. → SOLANACEAE. Baquar, S. R., 1968, Cytomorphological studies in the family Solanaceae from West Pakistan, *Genetica*, **38**, 389-397. A chromosome survey of the species of Solanaceae of West Pakistan. The following chromosome numbers are reported for species which are also found in Britain:—*Solanum nigrum*, $n = 12$; *S. dulcamara*, $n = 14$; *S. pseudocapsicum*, $n = 12$; *Hyoscyamus niger*, $2n = 34$; *Datura stramonium*, $n = 24$, and *Nicotiana rustica*, $n = 24$.—[D.H.K.]

411/1. HYOSCYAMUS NIGER L. Schneider, M. J., Borthwick, H. A. & Hendricks S. B., 1967, Effects of radiation on flowering of Hyoscyamus niger, *Am. J. Bot.*, **54**, 1241-1249.

412. PHYSALIS. Waterfall, U. T., 1967, Physalis in Mexico, Central America and the West Indies, *Rhodora*, **69**, 319-329.

413. SOLANUM. Juhász, M., 1966, Effect of ecological factors on the leaf epidermis of species of Solanum, *Acta Univ. szeged.* (*Biol.*), **12**, 29-36. Studies on *Solanum laciniatum* Ait., *S. nigrum* and *S. dulcamara* growing under different environmental conditions showed that these had a considerable influence on the tissue structure of the leaf epidermis.—[D.H.K.]

416. → SCROPHULARIACEAE. Skalický, V., 1966, Bemerkungen zu einiger Arten der familie Scrophulariaceae, *Nov. bot. Hort. Bot. Univ. Prag.*, **1966**, 55-64. Notes on a number of Czech species of the Scrophulariaceae including *Veronica officinalis* var. *officinalis* and var. *alpestris* Celak. *Veronica filiformis* is reported as an adventive new to southern Bohemia where it was discovered in 1966.—[D.H.K.]

424. SCROPHULARIA. Vaarama, A. & Hiirsalmi, H., 1967, Chromosome studies on some Old World species of the genus Scrophularia, *Hereditas*, **58**, 333-358. Chromosome numbers and geographical distributions of 22 Old World species of *Scrophularia* are given. *S. auriculata* L. (*S. aquatica* L.), $2n = 78$, occurs throughout Atlantic Europe from the Mediterranean region where it grows as far east as Crete. *S. umbrosa* has two chromosome numbers, diploid, $2n = 26$ and tetraploid, $2n = 52$, the latter possibly being a hybrid between diploid *S. umbrosa* and *S. auriculata*. Its native range appears to be chiefly in central Europe, extending from the European Atlantic coast over central and southern Europe, Asia Minor and Afghanistan to the western Himalayas and Altai Mountains. *S. nodosa*, $2n = 36$, has a wide range on the European continent, and is absent only from the extreme northern and southern parts. In Asia its distribution continues through the Caucasus, Iran and the Altai Mountains to central Siberia. It has also an additional disjunct area in the Far East—Japan Korea and parts of northern China, but this needs further investigation as the plant may prove to be a distinct taxon. *S. scorodonia*, $2n = 36$, occurs from southern England along the European Atlantic coast to Spain and along the Mediterranean coastlands from Morocco to Tunisia; it occurs also in the Canary Islands, the Azores and Madeira. *S. vernalis*, $2n = c. 40$, grows over a major part of Europe, but in Fennoscandia is found only in the southern parts. *S. peregrina* L., $2n = 36$, is native in the Mediterranean regions of Europe and Asia; it occurs also on the North African side, on the coastal part of the Atlas area from Morocco to Tunisia. Elsewhere in Europe it is an established, or casual, adventive.—[D.H.K.]

425. MIMULUS. Hadfield, M., 1967, The genus Mimulus, *Gdnrs' Chron.*, **162** (14), 22. Species of *Mimulus* considered suitable for cultivation are *M. luteus*, *M. guttatus* and *M. cupreus*. These are briefly described and discussed.—[D.H.K.]

425. MIMULUS. Vickery, R. K., Junr., 1967, Ranges of temperature tolerance for germination of Mimulus seeds from diverse populations, *Ecology*, **48,** 647-651.

425/1. MIMULUS GUTTATUS DC. Lindsay, D. W. & Vickery, R. K., Junr., 1967, Comparative evolution in Mimulus guttatus of the Bonneville Basin, *Evolution*, **21,** 439-456.

429. DIGITALIS. Tolrnavschi, I. T. & Lungeanu, I., 1967, Contributii la stadiul cariologie al unor specii din genul Digitalis L., *Comm. Bot.* (*'Univ. Babes Bolyai'*): *Omagia Octogenarului Professor Dr. docent Alexandra Borza*, 425-430. Karyological studies on *Digitalis*.—[D.H.K.]

430. VERONICA. Bocquet, G., Favarger, C. & Zürcher, P., 1967, Un hybride méconnu dans la flore des Alpes françaises et italiennes: Veronica allionii × officinalis et synonymie correcte de quelques Veronica, *Bauhinia*, **3,** 229-242. Plants intermediate between *Veronica allionii* and *V. officinalis* were found in the French and Italian Alps. The chromosome number of the former has been determined as $2n = 18$, the latter as $2n = 36$. The hybrid has $2n = 27$. A description of the hybrid is given, its characters being intermediate between the two parents. Its name should be *V.* × *tournefortii* (Villars) Schmidt. Synonymy of the three names is given.—[E.B.B.]

430. VERONICA. Fischer, M., 1967, Beiträge zur Cytotaxonomie der Veronica hederifolia-Gruppe (Scrophulariaceae), *Ost. bot. Z.*, **114,** 189-223. A cytotaxonomic revision of the *Veronica hederifolia* group.

Veronica hederifolia L. *sensu lato* includes *V. triloba* Opiz, $2n = 18$, a diploid, which is widespread in the Balkans and south-east Europe to the Caucasus; **V. sublobata** M. Fischer, sp. nov., $2n = 36$, a tetraploid, widespread in eastern and northern Europe, and *V. hederifolia* L. *sensu stricto.*, $2n = 54$, a hexaploid, widespread through central and northern Europe, and adventive in North America. Closely allied to these three species are *V. sibthorpioides* Deb. & Deg., $2n = 30$, a tetraploid from southern Spain and Morocco, and *V. hederoides* M. Fischer, sp. nov., $2n = 18$, a diploid from the south-western Himalayas.

Both *V. sublobata* and *V. hederifolia s.s.* are said to occur in the British Isles, the former being the commoner of the two species in southern England, and the latter being the more common in Scotland. *V. sublobata* is frequent as a garden weed while *V. hederifolia* is usually found in shady places, on arable ground, etc.

The synonymy of *V. sublobata* is as follows:—*V. hederifolia* L. subsp. β *lycorum* Klett & Richter, 1830, *Fl. v. Leipzig*, 20; *V. hederifolia* L. var. β *praestabilis* Beck, 1892, *Fl. v. Niederöstereich*, 1048; *V. hederifolia* L. (subsp.) a. *genuina* Celak., 1867-75, *Prod. Fl. Böhmen*, 333; *V. hederifolia* L. f. *opaca* G. Fischer, *Fl. exsicc. Bavar.*; *V. hederifolia* L. var. *praepropera* Murr, 1923, *Fl. v. Vorarlberg*; *V. hederifolia* L. var. *umbrosa* H. Mart., 1950, in Raunkiaer, *Dansk. Exc. Fl.* The species differs from *V. hederifolia* in the following ways:—height 5-40 cm. (10-60 cm. in *V. hederifolia*); leaves thin in texture with 5-7 (9) small lobes (fleshy, with ± acute teeth in *V. hederifolia*); corolla 4-6 mm. pale purple-lilac to white (6-9 mm., bright blue, streaked with violet in *V. hederifolia*), and pedicels 3·5-7 times as long as calyx (2-4 times as long in *V. hederifolia*).

Descriptions, synonymy and a key to the identification of the various species is given, together with ecological, distributional and phytosociological data.—[D.H.K.]

430. VERONICA. Raitanen, P. R., 1967, Taxonomic studies on Veronica longifolia and V. spicata in Eastern Fennoscandia, *Ann. Bot. Fenn.*, **4,** 471-485. The chromosome number of Finnish gatherings of *Veronica longifolia* proved, with one exception, to be $n = 17$. Previous counts on the species outside Finland have usually provided the number $n = 34$. The latter number was found only in

material from eastern Finland. Finnish material of *V. spicata* gave the number $n = 34$. Morphological studies on the two species showed that although they were distinct, intergrading appeared to be present, particularly in Karelia. It is suggested that introgression between the two species may be taking place. The tetraploid strain ($n = 34$) from Kuusomo, eastern Finland fits the description of *V. septentrionalis* Borissova.—[D.H.K.]

430. VERONICA.—See 102. RORIPPA.

430/10. VERONICA FRUTICANS Jacq. Mitchell, J., 1967, Veronica fruticans in West Perth, *Glasg. Nat.*, **18,** 523.

432. PEDICULARIS. Hartl, D., 1967, Interkalarblätter bei Pedicularis L., *Ost. bot. Z.*, **114,** 119-124.

433. RHINANTHUS. Tschermak-Wooss, E., 1967, Der eigenartige verlauf der I meiotischen Prophase von Rhinanthus, die Riesenchromosomes und das besondere Verhalten der Kurzen Chromosomen in Mitose, Meiose und hochendopolyploiden Kernen, *Caryologia*, **20,** 135-152.

434/3. MELAMPYRUM PRATENSE L. Jalas, J., 1967, Populationsstudien on Melampyrum pratense L. in Finnland, 3. Merkmalsverbreitung und Taxonomie, *Ann. Bot. Fenn.*, **4,** 486-526. Further population studies on *Melampyrum pratense* in Finland, together with a revision of the Finnish subspecies and varieties.—[D.H.K.]

435. EUPHRASIA. Schaeftlein, H., 1967, Beiträge zur Kenntnis einiger Mitteleuropäischer Euphrasien, 1. Der taxonomische Werte der drüsigen Behaarung, *Phyton*, **12,** 48-90. Studies on mid-European *Euphrasia* populations, including *E. rostkoviana*, *E. vernalis—stricta*, *E. drosocalyx* Freyn, *E. minima* Jacq. The name **E. vernalis** List (1837) predates the name *E. brevipila* Burnat & Gremli (1884), which the author claims are conspecific.—[D.H.K.]

435/1 (19). EUPHRASIA ROSTKOVIANA Hayne. Schaeftlein, H., 1966, Verbänderte Euphrasien, *Mitt. naturw. Ver. Steierm.*, **96,** 105-109. Notes on fasciated forms of *Euphrasia rostkoviana* in Germany.—[D.H.K.]

440/8. OROBANCHE MINOR Sm. Jeppsson, L., 1967, Ett fynd av Orobanche minor Sm.; Skåne, *Bot. Notiser*, **120,** 488-489. *Orobanche minor* has been discovered in a clover field in Scania, southern Sweden. It is new to the province, and is a very rare species in Scandinavia.—[D.H.K.]

440/9. OROBANCHE PICRIDIS F. W. Schultz ex Koch. Bolman, J., 1967, Bitterkruidbremraap (Orobanche picridis Schultz ex Koch), *Natura*, **64,** 172-175. An account of *Orobanche picridis* in the Netherlands.—[D.H.K.]

442. UTRICULARIA. Casper, S. J., 1967, Die Gattung Utricularia L. (Lentibulariaceae) im thuringsch—sächsischen Raume, *Limnologica*, **5,** 81-104.

445.→ LABIATAE. Knowles, E., 1967, Cultivars of British wild plants, 20. More Labiates, *Gdnrs' Chron.*, **162** (7), 10. Among cultivars of British species of the Labiatae are *Ajuga reptans* 'Alba', with white flowers; 'Rubra', with red or pink flowers; 'Variegata', with leaves splashed and edged with cream colouring; 'Atropurpurea', with dark bronze leaves; 'Rainbow', with foliage marbled in yellow, dark red and purple, and 'Multicolor', similar to the latter but with more rose colouration on the leaves. *A. pyramidalis* is also sometimes grown in gardens.

The cultivars of *Prunella vulgaris* include 'Webbiana', with rosy-purple flowers; 'Rosea', with pale pink flowers; 'Alba', with white flowers, and 'Loveliness', with deep cut leaves and pink flowers, it is possible, however, that the latter may be referable to *P. laciniata*.

Glechoma hederacea 'Variegata', with variegated leaves is also sometimes grown in gardens.—[D.H.K.]

445.→ LABIATAE. Knowles, E., 1967, Cultivars of British wild plants, 29. Aromatic plants of the mint family, *Gdnrs' Chron.*, **162** (19), 19. Descriptions are given of cultivars of some of the aromatic species of the Labiatae. These include hybrids involving *Thymus serpyllum*, *T. drucei* and *T. pulegioides*, *Mentha* × *piperita*, *Salvia pratensis* and *S. verbenaca*. The cultivars of *Salvia pratensis* include 'Alba', with white flowers; 'Rosea', with rose-purple flowers; 'Rubicunda', with rose-red flowers; 'Atroviolacea', with dark violet flowers, and two with bicolored flowers—'Variegata', blue and white, and 'Lupinoides', bluish-purple and white.

Melittis melisophyllum 'Album' with white flowers, and 'Grandiflorum', with cream and purple-red flowers are occasionally cultivated in gardens.

There are a number of cultivars of *Origanum vulgare*, including 'Aureum', with compact golden leaves, this produces very few flowers; 'Compactum', a bushy plant, up to a foot tall with small violet-purple flowers, and 'Bury Hill', with deeper, almost heliotrope coloured flowers with indigo braeteoles on wiry stems. —[D.H.K.]

445.→ LABIATAE. Wunderlich, R., 1967, Ein Vorschlag zu einer naturlichen Gliederung der Labiaten auf Grund der Pollen körner, der Samenentwicklung und des reifen Samens, *Ost. bot. Z.*, **114**, 383-483. Phylogenetic studies on the Labiatae based on studies of cells, pollen grains and seeds. As a result of these studies a new classification of the Labiatae is tabulated.—[D.H.K.]

445. MENTHA. Gilbert, J. L., 1967, The history of some ornamental mints, *Gdnrs' Chron.*, **162** (13), 16-17; *loc. cit.*, **162** (14), 12-13.

445. MENTHA. Olsson, U., 1967, Chemotaxonomic analysis of some cytotypes in the Mentha × verticillata complex (Labiatae), *Bot. Notiser*, **120**, 255-267. A polyploid series of spontaneous plant material of *Mentha arvensis* L. and *M. aquatica* L. and their presumed hybrid products has been the subject of a thin-layer chromatographic investigation. The predictable genetic relationships have been studied through qualitative and quantitative analysis of the biochemical data.—[Author's summary]

445. MENTHA. Ouweneel, W. J., 1967, Het geslacht Mentha in Nederland, *Gorteria*, **3**, 213-224. Notes on the *Mentha* species found in Holland with a key to the identification of species and hybrids.—[D.H.K.]

448. THYMUS. Bonnet, A. L. M., 1967, Contribution a l'étude caryologique du genre Thymus, 5. A propos de Thymus alpigenus Kerner, Thymus mastichina L., Thymus polytrichus Kerner et Thymus pulegioides L., *Naturalia monspel., sér. bot.*, **18**, 193-199.

457/1. PRUNELLA VULGARIS L. Nelson, A. P., 1967, Racial diversity in Californian Prunella vulgaris, *New Phytol.*, **66**, 704-746. Studies on racial diversity in Californian populations of *Prunella vulgaris* subsp. *lanceolata*. Comparisons are made with similar studies by other authors on European populations of *P. vulgaris* subsp. *vulgaris*.—[D.H.K.]

461/1. LAMIASTRUM GALEOBDOLON (L.) Ehrendorf. & Polatschek (*Galeobdolon luteum* Huds.). Knight, G. H., 1966, The creeping of Archangel, *Rep. Warwick nat. Hist. Soc.*, **12**, 10-13. Much of the spread of *Lamiastrum galeobdolon* is by vegetative means but seed is readily formed, and when collected and sown in woodland it germinated in February and March to produce established seedlings 2-3 inches high by the following May. Studies on the growth of the stolons showed that their maximum extension was from late May to late July. The unusual distribution of the species in Britain is commented upon.—[D.H.K.]

470. TEUCRIUM. Grzybeck, J., 1967, Morfologiczne i anatomiczne porównanie Krajowych gatunków rodzaju Teucrium L., *Acta biol. cracov., sér. bot.*, **10**, 39-54. Morphological and anatomical comparisons are made on the five species of

Teucrium indigenous to Poland, viz.—*T. botrys*, *T. chamaedrys*, *T. montanum* L., *T. scordium* and *T. scorodonia*.—[D.H.K.]

472. Plantago. Stebbins, G. L. & Day, A., 1967, Cytogenetic evidence for long continued stability in the genus Plantago, *Evolution*, **21,** 409-428.

474.→ Campanulaceae. Contandriopoulos, J., 1967, Contribution à l'étude cytotaxinomique des Campanulacées de Grèce, 2, *Bull. Soc. bot. Fr.*, **113,** 453-474. Chromosome numbers are given for about 40 species of Campanulaceae from Greece. *Campanula glomerata*, $2n = 30$; *C. rapunculoides*, $2n = c.\ 102$; *C. rotundifolia* L., *sensu lato*, $2n = 34$ and 68; *C. patula*, $2n = 20$, and *Jasione montana*, $2n = 12$, are included.—[E.B.B.]

475. Campanula. Knowles, E., 1967, Cultivars of British wild plants, 22. Bell flowers, sea lavender and thrift, *Gdnrs' Chron.*, **162** (10), 14. Cultivars of British species of *Campanula* include *C. latifolia* 'Alba', with white flowers; 'Macrantha', which is more densely flowered than the wild plant, and 'Brentwood', which has flowers of a deeper purple. *C. glomerata* 'Alba', has white flowers, and 'Lilacina', pale violet-purple flowers. The double-flowered form of *C. rotundifolia* is sometimes grown in gardens, while cultivars include 'Spetchley white', with extra large white flowers, and 'Olympia', with very large deep blue flowers. *C. patula* is rarely seen in cultivation today though *C. trachelium* is sometimes grown.

A number of cultivars of *Limonium vulgare*, *Armeria maritima* and *A. arenaria* are also described.—[D.H.K.]

484. Cruciata. Hämet-Ahti, L., 1967, Cruciata laevipes Opiz and C. glabra (L.) Ehrend. in Finland, *Mem. Soc. Fauna Flora fenn.*, **43,** 74-77. *Cruciata laevipes* and *C. glabra* were introduced into Finland during the Second World War. The former was probably introduced with forage for horses and mules, while the latter persists in places where German troops deposited large heaps of horse manure.

C. laevipes is widespread in Europe from the Mediterranean to southern Scotland, and occurs also from Turkey to the Caucasus and Iran. *C. glabra* is more restricted, being found in Spain, southern France, Switzerland, and the Balkans to southern Russia and the Caucasus. It differs from *C. laevipes* in its narrower leaves and the absence of prefloral leaves in the cymes. Its leaves and stems are usually glabrous, but the margins of the former are ciliate while the latter are sometimes pubescent at the base.—[D.H.K.]

485. Galium. Buttler, K. P. & Bresinsky, A., 1966, Beitrag zur cytologie von Galium Ser. Silvatica, *Ber. bayer. bot. Ges.*, **39,** 25-28.

485. Galium. Krendl, F., 1967, Cytotaxonomie der Galium mollugo-Gruppe in Mitteleuropa (Zur Phylogenie der Gattung Galium, 8), *Ost. bot. Z.*, **114,** 508-549. A revision of the *Galium mollugo* complex in mid-Europe with full descriptions, synonymy and a key to the identification of species, etc.

Galium mollugo, $n = 11$, $2n = 22$, is shown to be a species confined to the Mediterranean region, south and mid-Europe, and the British plant, a variable, tetraploid species, is referred to **G. album** Mill. subsp. **album** (*G. erectum* Huds., 1778, non Huds., 1762; *G. mollugo* L. var. *erectum* (Huds.) Aschers., *G. mollugo* L. subsp. *erectum* (Huds.) Briquet, *G. mollugo* L. var. *angustifolium* Leers, *G. mollugo* L. subsp. *mollugo* sensu Hayek). It is widespread in northern Europe.—[D.H.K.]

487/1. Sambucus ebulus L. Synnott, D. M., 1968, Sambucus ebulus L. in Co. Louth, *Ir. Nat. J.*, **16,** 27.

488/1. Viburnum lantana L. Sipkes, C., 1967, Viburnum lantana L. in de duinen, *Gorteria*, **3,** 202-203. Notes on three localities in the Netherlands dunes where *Viburnum lantana* has been found, presumably dispersed by birds from neighbouring parks or gardens.—[D.H.K.]

494. VALERIANELLA. Coode, M. J. E., 1967, Materials towards a Flora of Turkey, 15. Valerianaceae: Valerianella, *Notes R. bot. Gdn. Edinb.*, **27**, 219-256. A revision of *Valerianella* in Turkey, including all the species also found in Britain. Full descriptions, synonymy, keys to the identifications of species and illustrations of the fruits are given.—[D.H.K.]

501.→ COMPOSITAE. Knowles, E., 1967, Cultivars of British wild plants, 27. A few of the daisy family, *Gdnrs' Chron.*, **162** (16), 14. Cultivars of *Solidago virgaurea* var. *cambrica* include 'Nana', 'Alpestris' and 'Minuta', all less than a foot high, with large flower heads, and 'Praecox', with upright golden plumes, this plant grows up to three and a half feet high, and flowers earlier than the wild plant.

Antennaria dioica 'Rosea', has deep pink flowers and forms dense mats of silver-grey foliage; 'Minima', is a smaller plant, and 'Tomentosa' has more densely hairy leaves and forms thick grey mats.

Many cultivars of *Bellis perennis* are grown in gardens, among these 'Rob Roy', has brilliant red-quilled double heads; 'Dresden China', has pink-quilled double heads, and 'Pomponette Red Buttons' and 'Pomponette Pink Buttons' have crimson- and pink-quilled double heads respectively. 'Flore pleno' is a giant double-flowered cultivar with flat ray florets of red, pink and white, while 'Aucubifolia', has large white- or red-flowered heads and leaves stained and veined with yellow.

Among cultivars of *Centaurea cyanus* are 'Plena', which has more florets than the wild plant; 'Rosea', a double-flowered, rose-coloured variant; 'Polka Dot', a dwarf form in a variety of colour forms from deep blue to pink and white. *Cichorium intybus* is also in cultivation.—(D.H.K.)

501.—COMPOSITAE. Knowles, E., 1967, Cultivars of British wild plants, 28. Airomatic plants of the daisy family, *Gdnrs' Chron.*, **162** (17), 24. A number of cultvars of *Achillea millefolium* are seen in gardens. These vary mainly in the colour of the ray florets, and include the following: 'Cerise Queen' (cherry-red); 'Crimson Beauty' (deep cherry-red); 'Fire King' (deep red); 'Kelway Purple' (purple); 'Rosea' (rose) and 'Rubra' (red). Several double-flowered forms of *A. ptarmica* are cultivated, including 'Perry's White' and 'Snowball'.

Chamaemelum nobile 'Pleno', with double flowers is sometimes grown as is *Chrysanthemum vulgare* 'Crispum', which has curled foliage and is less rampant than the wild plant. *C. parthenium* 'Aureum', a yellow-leaved form, and 'Flore pleno' with double flowers are commonly cultivated. *Eupatorium cannabinum* 'Plenum', which has numerous pinkish-purple ray florets is also grown.—[D.H.K.]

501.→ COMPOSITAE. Solbrig, O. T., 1967, Some aspects of Compositae of evolutionary interest, *Taxon*, **16**, 304-307.

502. BIDENS. In *Proc. bot. Soc. Br. Isl.*, **7**, 45 (1967), the abstract of Corillions paper on *Bidens vulgata* (*Bull. Soc. Scient. Bretagne*) should be corrected as follows:—

	B. vulgata
Margin of achenes;	With erect spines on the lower three-quarters; reflexed spines on the upper quarter. . . .

—[E.B.B.]

503. GALINSOGA. Kobrle, A., 1965, Varieties of the genus Galinsoga Ruiz et Pavon in Bohemia, *Nar. Muz. Prír. Muz. Oddil Prirodoved. Cas.*, **134**, 224-228.

504/1. AMBROSIA ARTEMISIIFOLIA L. Bonnet, E.-J., 1967, Ambrosia artemisiifolia L., *Bull. Soc. Linn. Lyon*, **36**, 348-359. A full account of this adventive to the European flora is given with information on its origin, history, ecology, phytogeography, morphology, and on work so far published on its taxonomy and other aspects.—[E.B.B.]

505. Xanthium. Widder, F. J., 1967, Östafrikanische Xanthium-Arten, *Phyton*, **12**, 182-189. A revision of the East African species of *Xanthium*.—[D.H.K.]

505/1. Xanthium strumarium L. Lange, E., 1968, Zum Vorkommen von Xanthium strumarium in Mitteleuropa, *Feddes Rep.*, **77**, 57-60.

506. Senecio. Antoine, G. & Weill, J., [1966], 1967, Un Senecio sud-africain à Calais, *Bull. Soc. bot. Fr.*, **113**, 342-344. The authors report the discovery of *Senecio harvieanus* Mac-Owan, a native of South Africa, growing as a weed near Calais.—[D.H.K.]

506/1. Senecio jacobaea L. Anon., 1967, Ragwort, Senecio jacobaea declared noxious weed, *Tasm. J. Agric.*, **38**, 157-159. Notes on the introduction and spread of *Senecio jacobaea* into Tasmania with recommendations for its control and eradication.—[D.H.K.]

508/1. Tussilago farfara L. Arkharova, L. A., 1967, Chemical control of the weed Tussilago farfara, *Khimiya Sel.' Khoz.*, **5**, 45-49.

509. Petasites. Toman, J., 1966, Pokyny k sberu mapovaných rostlin, Petasites, *Zprávy Cesk. Bot. Spolecn. CSAV*, **1**, 76-84. A key is provided to the identification of the species of *Petasites* found in Czechoslovakia.—[D.H.K.]

512/4. Inula conyza DC. Ulbrich, M., Lorenz, H., Rittenbach, P., Rossow, N. & Voigt, O., 1966, Inula conyza as a cause of mass poisoning among cattle, *Mh. VetMed.*, **21**, 896-902. Details are given of an outbreak of poisoning among housed cows and heifers fed with cut lucerne contaminated with flowering *Inula conyza*. Three animals died, and a further twenty-six had to be slaughtered. Three pigs also died.—[D.H.K.]

513/2. Pulicaria vulgaris Gaertn. Salisbury, E. J., 1967, The reproductive biology of Pulicaria vulgaris Gaertn. and its diminishing frequency, *Ann. Bot.*, **31**, 699-712. Data are furnished respecting the average output of fruits of *Pulicaria vulgaris* and the 'reproductive capacity' is estimated at about 2,300. Germination experiments are described that show this to be quasi-simultaneous both in light and in darkness. This is contrasted with the more prolonged germination of *P. dysenterica*. The seedling of *P. vulgaris* has a prominently developed collet which bears numerous supporting row-hairs. Comparison of the effects of homogenous and heterogenous competition in cultures indicate that this may be an important factor in determining the predominant occurrence of *P. vulgaris* in habitats poor in bases. Viviparous germination is recorded; this hazard and the late maturation of fruits are suggested as possible factors determining the 'continental' type of distribution of the species.

Despite its reproductive potential and effective dispersal, *P. vulgaris* has markedly diminished in frequency and this, it is suggested, may be a consequence of successional repression.—[Author's summary]

516/1. Anaphalis margaritacea (L.) Benth. Favreay, G. & Raymond, Y., 1967, Etude préliminaire des pigments des sommités fleuries d'Anaphalis margaritacea L., *Naturaliste canad.*, **94**, 63-71.

517. Antennaria. Beals, E. W., 1968, A taxonomic continuum of the genus Antennaria in Wisconsin, *Am. Midl. Nat.*, **79**, 31-47.

517. Antennaria. Urbanska-Worytkiewicz, K., 1967, Cytological investigations in Antennaria Gaertn. from North Scandinavia, *Acta boreal., ser. A Scientia*, **22**, 1-14. Five species of *Antennaria* have been studied cytologically from sixty-three natural habitats in northern Scandinavia. The following chromosome numbers are provided:—*A. dioica*, $2n = 28$; *A. carpathica* (Wg.) Bluff & Fingerh., $2n = 28$ and 42; *A. alpina* (L.) Gaertn., $2n = 70$ and 84-85 and *A. porsildii* Elis. Ekm., $2n = 70$.—[D.H.K.]

519. Aster. Huziawara, Y., 1967, Chromosomal evolution in Aster and its related genera, *Taxon*, **16**, 301-303.

521. Erigeron. Engelskjön, T., 1967, Contribution to the cytotaxonomy of Erigeron humilis Grah., E. uniflorus L. and their hybrid, *Nytt Mag. Bot.*, **14,** 77-85. Material from northern and southern Scandinavia shows that *Erigeron humilis* and *E. uniflorus* are cytologically distinct, the former being tetraploid with $2n = 36$, the latter diploid with $2n = 18$.

Some biotypes with the triploid chromosome number $2n = 27$ are hybrids between *E. humilis* and *E. uniflorus*. Although pollen- and seed-sterile, these hybrids constitute an important part of the material deposited in public herbaria. Triploids are apparently frequent in the field, possibly persisting and propagating autonomously as vegetative rihizoclones.—[Author's summary]

521. Erigeron.—See 519. Aster.

531. Tripleurospermum. Hämet-Ahti, L., 1967, Tripleurospermum (Compositae) in the northern parts of Scandinavia, Finland and Russia, *Acta bot. fenn.*, **75,** 1-19. *Tripleurospermum maritimum* (L.) Koch (excluding *T. inodorum*) is represented in northern Europe by at least three subspecies, viz. subsp. *phaeocephalum* (Rupr.) Hämet-Ahti, along and near the coast of the Arctic Ocean from Novaya Zemlya to the Nordland district; subsp. *subpolare* (Pobed.) Hämet-Ahti, from the northernmost Ural Mountains to the middle of Norway, and subsp. *maritimum sensu lato* along the Atlantic coast to western Finnmark, and on the shores of the Baltic north to Kvarken. The haploid chromosome number of *T. maritimum* subsp. *subpolare* is 9. The hybrids of *T. inodorum* × *T. maritimum* subsp. *subpolare*, *T. maritimum* subsp. *phaeocephalum* ≷ subsp. *subpolare* and *T. maritimum* subsp. *maritimum* ≷ subsp. *phaeocephalum* are reported from northern Fennoscandia.—[Author's summary]

539. Carduus. Kazmi, S. M. A., 1964, Die Gattung Carduus in Deutschland, *Ber. bayer. bot. Ges.*, **37,** 53-59. A revision of the German species of *Carduus* with descriptions, synonymy, keys to the identification of species, etc.—[D.H.K.]

539/c. Carduus crispus L. Mizushima, M., 1967, On Carduus crispus L. in Japan, *J. Jap. Bot.*, **42,** 276-277. The European-Siberian species *Carduus crispus* is not represented in Japan by its typical form with achenes 3 mm. long, thinly cobwebby involucre, and upper leaves not semi-amplexicaule at the bases and white tomentose beneath. Japanese plants have middle to upper leaves semi-amplexicaule at the base, and are not, or scarcely, cobwebby beneath, while the involucres are entirely glabrous, and the ripe achenes 4 mm. long. Rothmaler (*Exkurs.-fl. Deutschland Krit. Erganz.-bd.*, 333, 1963), refers plants of this kind to subsp. *agrestis* (Kerner) Vollmann of the northern part of the Alps. A more detailed examination is needed to determine the identity of these disjunctively found populations, though *C. crispus* has been recorded from western Siberia, Central Asia to the Far East, and China.—[D.H.K.]

540/4. Cirsium arvense (L.) Scop. Evans, E. & Pfeiffer, R. K., 1967, Selective phytotoricity of 2,4-Dichloro 6, (o-chloroanilino)-s-triazine ('Dyrene') to Cirsium arvense, *Nature*, **215,** 782-783. Data is given on the susceptibility of *Cirsium arvense* to fungicide application of 'Dyrene' in Britain and Canada.—[D.H.K.]

544. Centaurea. Dipali, D. & Sharma, A. K., 1967, Chromosome studies in the genus Centaurea, *Folia biol. Pologne*, **15,** 191-207.

544. Centaurea. Dittrich, M., 1968, Karpologische Untersuchungen zur Systematik von Centaurea und verwandten Arten, *Bot. Jrb.*, **88,** 70-122.

550. Leontodon. Finch, R. A., 1967, Natural chromosomal variation in Leontodon, *Heredity*, **22,** 359-386. Chromosomes in natural populations of *Leontodon autumnalis* ($n = 6$), *L. taraxacoides* ($n = 4$) and *L. hispidus* ($n = 7$) were found to show considerable variation, and triploid plants were noted in *L. taraxacoides* and *L. hispidus*. The hybrid **L. hispidus** × **taraxacoides** was

detected in a number of wild populations in Britain, and not only F_1 plants were seen but a backcross was also noted.—[D.H.K.]

550. Leontodon. Widder, F. J., 1967, Diagnoses stirpium novarum v-vii, *Phyton*, **12**, 200-215. A number of new species of *Leontodon* are described from Spain and the Near East.—[D.H.K.]

554/4. Lactuca tatarica (L.) C. A. Mey. Mey, P. de, 1968, Lactuca tatarica (L.) C. A. Mey. te Rotterdam, *Gorteria*, **4**, 27-28. A second locality in Rotterdam for the adventive *Lactuca tatarica* is described.—[D.H.K.]

556/2. Sonchus arvensis L.—See 559. Crepis.

557/3. Cicerbita macrophylla (Willd.) Wallr. Skalická, A., 1966, Cicerbita macrophylla (Willd.) Wallr. *s.l.* ein für die Tschechoslowakei neuer Neophyt, *Nov. Bot. Hort. Bot. Univ. Prag.*, **1966**, 47-54. *Cicerbita macrophylla*, an adventive new to Czechoslovakia, is described and a table shows its diagnostic characters in comparison with *C. alpina*. Details of its distribution in the country are provided.—[D.H.K.]

558. Hieracium. Huber-Morath, A., 1967, Hieracia Helvetica, *Bauhinia*, **3**, 169-188. A catalogue of Swiss *Hieracia* with details of localities from whence they have been recorded.—[D.H.K.]

558. Pilosella. Gadella, T. W. J. & Kliphuis, E., 1968, Einige opmerkingen over Hieracium pilosella L. in Nederland, *Gorteria*, **4**, 17-26. Studies on *Pilosella* in the Netherlands have shown that *Pilosella officinarum* which is widespread occurs as a tetraploid race ($2n = 36$), and a pentaploid race ($2n = 45$). The investigation has also revealed the presence in the country of diploid ($2n = 18$) and triploid ($2n = 27$) races of *P. peleteriana*, these are rare and are apparently confined to the Isle of Terschelling. Descriptions and illustrations of both species are given, and a map shows their range in Europe.—[D.H.K.]

558. Pilosella. Lepage, E., 1967, Etude de quelques hybrides chez nous épervieres (Hieracium) adventices, *Naturaliste can.*, **94**, 609-619. Most of the species of *Pilosella* introduced from Europe and now naturalised in Canada are freely crossing between one another, and hybrids involving *P. aurantiaca*, *P. caespitosa*, *P. floribunda* and *P. officinarum* are reported and described.—[D.H.K.]

559. Crepis. Espinar, L. A., 1967, Contribucion al conocimiento de las Compositae adventicias en la Argentina, *Kurtziana*, **4**, 73-82. *Crepis pulchra* is recorded as an adventive new to Argentina, and a key is provided to distinguish it from the other species which are already naturalised in the country, viz. *C. foetida*, *C. setosa* and *C. capillaris*.

Sonchus arvensis is also reported as an adventive new to the country; hitherto it had been confused with *S. oleraceus*.—[D.H.K.]

560. Taraxacum. Englskjøn, T., 1967, Cyto-embryological studies in Arctic-Alpine Taraxaca, 1. The Bear Island Taraxacum, *Nytt Mag. Bot.*, **14**, 125-137.

560/T. Tagetes. Espinar, L. A., 1967, Las especies de Tagetes (Compositae) de la region Central Argentina, *Kurtziana*, **4**, 51-71. A critical revision of *Tagetes* in Central Argentina with descriptions, and a key to the identification of species, some of which have occurred in Britain as 'wool aliens'.—[D.H.K.]

563. Alisma. Björkqvist, I., 1967-68, Studies in Alisma L., 1. Distribution, variation and germination, *Opera Bot.*, **17** (1), 1-128. The generic limits of *Alisma* are outlined, and detailed geographical distributions provided for the various species. With regard to the three species found in the British Isles, *A. plantago-aquatica* has the widest range, being distributed through Europe and Asia except for the northernmost parts: it occurs also on the Mediterranean coasts of Europe and North Africa and reaches a high level (1,000-2,500 metres) in some localities in Equatorial East Africa. It is unrecorded from Iceland, the Faroes, Shetlands and Orkneys, but is common in Scandinavia except in the extreme north.

A. lanceolatum is distributed almost completely within the range of *A. plantago-aquatica* with which it often grows, but extends to the Azores and Madeira. It does not, however, extend as far northward, or as far eastward in Central Asia. In the Mediterranean region and Asia Minor it is the commonest species of the genus, and is also represented by two cytotypes, $2n = 26$ and $2n = 28$, which are morphologically indistinguishable.

A. gramineum is more restricted and does not occur in south-west Europe or in the European part of the Mediterranean region. Its eastern boundary is somewhat uncertain, but it also has two areas of distribution in North America. In Scandinavia it is known only from Denmark where it is rare; it also formerly grew in a solitary locality in Sweden but was eradicated by dredging.

Detailed accounts are provided of the morphology, germination and seedling development of the various species, and information is given on experimental studies carried out on the effect of different soil mixtures and different water levels on germination and seedling development. : 2. Chromosome studies, crossing experiments and taxonomy, *loc. cit.*, **19**, 1-138. In a continuation of studies on *Alisma* the chromosomes have been extensively studied and the evolution of the various taxa, especially tetraploids and hexaploids, is discussed.

The following species are recognised:—*A. plantago-aquatica*, $2n = 14$; *A. lanceolatum*, $2n = 26$ and 28; *A. gramineum*, $2n = 14$; *A. wahlenbergii* (Holmberg) Juz., $2n = 14$ (restricted to coastal areas in Sweden, Finland and western Russia); *A. orientale* (Sam.) Juz., $2n = 14$ (East and Central Asia); *A. rariflorum* Sam., $2n = 26$ (restricted distribution area in southern Japan); *A. canaliculatum* A. Braun & Bouche, $2n = 42$ (South-eastern Japan and southern China); *A. subcordatum* Rafin., $2n = 14$ (South-eastern and Eastern United States) and *A. triviale* Pursh, $2n = 26$ (widespread in southern Canada and the northern and central United States).

A number of natural hybrids are recorded, including *A. lanceolatum* ($2n = 28$) × *plantago-aquatica*; the cytotype of *A. lanceolatum* with $2n = 26$ has not been found to hybridise with *A. plantago-aquatica* in the wild. In the Swedish province of Gotland a plant with $2n = 27$ is probably the putative hybrid *A. lanceolatum* ($2n = 28$) × *lanceolatum* ($2n = 26$).

The leaves of *A. lanceolatum* × *plantago-aquatica* are ± intermediate between the two parents, but the blade is attenuate and the apex gradually tapering, the inflorescence is also ± intermediate but rather compact.

Details are given of experimental crossings—the following of which were successfully obtained:—*A. lanceolatum* ($2n = 28$) × *plantago-aquatica*, *A. lanceolatum* ($2n = 26$) × *plantago-aquatica*, *A. gramineum* × *plantago-aquatica*, *A. gramineum* × *lanceolatum* ($2n = 28$), *A. gramineum* × *lanceolatum* ($2n = 26$). Backcrossing experiments between *A. lanceolatum* × *plantago-aquatica* and the two parental cytotypes usually resulted in the production of fertile seed.

Descriptions of the various species are provided, together with synonymy, and a key is provided to their identification.—[D.H.K.]

563/2. ALISMA LANCEOLATUM With. Frey, L., 1966, Studia embriologiczne nad Alisma lanceolatum With., *Acta biol. cracov., sér. Bot.*, **9**, 125-135. Embryological studies on *Alisma lanceolatum*.—[D.H.K.]

567.→ HYDROCHARITACEAE. Dupontreue, G., 1967, Deux hydrochoridacées rares dans le Nord de la France: Stratiotes aloides L. et Vallisneria spiralis L., *Revue Féd. Franc. Soc-Sci. Nat.*, **6**, 81-84. A description is provided for each of these two species and their distributions given in detail for northern France.—[E.B.B.]

569/1. EGERIA DENSA Planch. St. John, H., 1967, The pistillate flowers of Egeria densa Planch., *Darwiniana*, **14**, 571-575. A detailed account is given of the structure of the pistillate flowers of *Egeria densa*.—[D.H.K.]

570/1. Elodea canadensis Michx. Julin, E., 1967, Elodea canadensis vid Bottniska Vikens nordkust, *Bot. Notiser*, **120**, 373-374. The North American species *Elodea canadensis* is reported as an adventive in two localities on the northern shore of the Gulf of Bothnia, Sweden. It is new to the area, and notes are provided on its biology, propagation and dispersal.—[D.H.K.]

570/3. Elodea nuttallii (Planch.) St. John. de Langhe, J. E. & Delvosalle, L., 1964, A propos d'une nouvelle Elodéie pour la flore belge, *Naturalistes belg.*, **48**, 268-270. *Elodea nuttallii* was discovered in northern Belgium in 1966, and was thought to be new to the country. A subsequent examination of herbarium material, however, has revealed earlier gatherings, dating back to 1955, which had been confused with *E. canadensis*. A key is provided distinguishing the diagnostic characters of the two species.—[D.H.K.]

577/7. Potamogeton alpinus Balb. Soran, V. & Bosçaiu, N., 1967, Potamogeton alpinus Balb., o specie rara in flora Romaneiei, *Comm. Bot.*, **5**, 115-118. Ecological and biological notes on *Potamogeton alpinus*, a very rare species in Rômania, in a marshy area at Luci.—[D.H.K.]

579. Ruppia. Mason, R., 1967, The species of Ruppia in New Zealand, *N.Z. Jl. Bot.*, **5**, 519-531. Both *Ruppia maritima* and *R. spiralis* have been recorded from New Zealand, but a study of the genus has shown that although two species are present they are distinct from those previously mentioned. Accordingly they are described as *R. polycarpa*, sp. nov. and *R. megacarpa*, sp. nov.—[D.H.K.]

583.→ Liliaceae. Knowles, E., 1967, Cultivars of British wild plants, 21. The Lily family, *Gdnrs' Chron.*, **162** (8), 14. The cultivars of *Convallaria majalis* include 'Rubra', with pink flowers; 'Rosea', with rose-pink stripes on its tepals; 'Prolificons', with double flowers; 'Basiantha', with extra long stalked basal flowers; 'Fortin's Giant', larger, and more robust in all its parts, and 'Variegata', with leaves striped with white.

Several cultivars of *Polygonatum multiflorum* are commonly grown, e.g. 'Angustifolius', with narrow cladodes, and 'Latifolius' with broad, very glossy, cladodes.

The many forms of *Endymion non-scriptus* in cultivation include 'Alba', with white flowers; 'Grandiflora Alba', with large white flowers; 'Rosea', with pink flowers; 'Rubra', with deep pink flowers; 'Lilacina', with lilac flowers and 'Bracteata', a mutant with leafy floral bracts longer than the flowers. *Scilla verna* 'Rambureo', larger, and more robust than the native plant is also grown.—[D.H.K.]

588/1. Convallaria majalis L. Chrmiel, H., 1967, Glowne stanowiska kowalii (Convallaria majalis L.) w Polsce, *Acta Agrobot.*, **20**, 6-69. Studies on the distribution of *Convallaria majalis* in Poland. In the north-eastern parts of the country it occurs commonly, and is often dominant in forests, and is characterised by its hardiness and viability. In the warmer regions of southern and western Poland it usually occurs in mixed forests on slightly shaded sites, while in the colder regions of the north-west it is usually found on forest edges, slopes of gorges and in open clearings.

The nutritional and chemical requirements of the species are discussed at some length.—[D.H.K.]

590/1. Maianthemum bifolium (L.) Schmidt. Kawano, S., Ihara, M., Suzuki, M. & Iltis, H. H., 1967, Biosystematic studies on Maianthemum (Liliaceae Polygonotae), 1. Somatic chromosome number and morphology, *Bot. Mag., Tokyo*, **80**, 345-352. Studies on clones of *Maianthemum* species, including *M. bifolium*. The latter from 8 Japanese localities all gave $2n = 36$, as did material from Lund Botanic Garden, Sweden.—[D.H.K.]

593/1. Lilium martagon L. Priszter, S., 1967, Revision der Formen von Lilium martagon L., *Acta Bot. Sci. Hung.*, **13,** 175-200. The author recognises six subspecies of *Lilium martagon* in Europe and Asia Minor, as well as many varieties and forms. Descriptions and geographical distributions are provided for the various taxa, and a key is given to their identification.—[D.H.K.]

595. Tulipa. Southern, D. I., 1967, Species relationships in the genus Tulipa, *Chromosoma*, **23,** 80-94.

597/1. Gagea lutea (L.) Ker-Gawl. Dawson, R. W. B., 1966, The rescue of the Yellow Star of Bethlehem, *Rep. Warwick nat. Hist. Soc.*, **12,** 8-9.

598. Ornithogalum. Cullen, J. & Ratter, J. A., 1967, Taxonomic and cytological notes on Turkish Ornithogalum, *Notes R. bot. Gdn. Edinb.*, **27,** 293-339. A revision of *Ornithogalum* in Turkey, with descriptions, synonymy, cytological data and a key to the identification of the 24 species recognised. Species also found in Britain are included in the account.—[D.H.K.]

598/1. Ornithogalum umbellatum L. Czapik, R., 1966, Mechanism róznoicowania cytologznego w triploidalyarych populacjach Ornithogalum umbellatum, *Acto Biol. cracov., sér. Bot.*, **9,** 65-86. Embryological studies on triploid populations of *Ornithogalum umbellatum.*—[D.H.K.]

598/1. Ornithogalum umbellatum L. Morton, J. D., 1967, Star-of-Bethlehem (Ornithogalum umbellatum) in Renfrewshire, *Glasg. Nat.*, **18,** 523.

600/1. Endymion non-scriptus (L.) Garcke. Liger, J., 1967, Une nouvelle station normande d'Endymion nutans Dumort. ssp. lacaillei Corb., *Revue Soc. sav. hte Normandie*, **45,** 37-40. A new locality for *Endymion non-scriptus* subsp. *lacaillei*, which has white flowers and a more slender upright inflorescence than subsp. *non-scriptus*, at Maromme is described and associated species are listed. *E. non-scriptus* subsp. *lacaillei* is said to occur in England.—[E.B.B.]

605. Juncus. Knowles, E., 1967, Cultivars of British wild plants, 30. Sedges and rushes, *Gdnrs' Chron.*, **162** (20), 30. *Juncus effusus* 'Vittatus', and *Carex acuta* 'Variegata', both with leaves striped with yellow are sometimes grown in water gardens as are *C. riparia* 'Variegata', with white striped leaves, and 'Bowles Golden', with leaves suffused with rich golden yellow. *Carex pendula*, and *Luzula sylvatica* 'Variegata', which has a narrow pale edge to its leaves, are recommended as suitable subjects for shady places.—[D.H.K.]

605/1. Juncus squarrosus L. Zoller, H., 1967, Über das Vorkommen von Juncus squarrosus L. im Kanton Tessin, *Bot. Jb.*, **86,** 549-555. The first certain occurrence of *Juncus squarrosus* on the south side of the Alps, near Cari Croze, above Faido (Ct. Tessin) is reported. The ecology, biology and phytosociology of the species is discussed.—[D.H.K.]

606. Luzula. Lambert, A.-M. & Giesi, J., 1967, Observations Carylogiques sur les Luzules, *Inf. Am. Caryosyst. Cytogen.*, **1,** 27-35. Cytological studies on *Luzula.* The following chromosome numbers are reported:—*L. pilosa*, $n = 36$; *L. forsteri*, $n = 12$ & $2n = 24$; *L. sylvatica*, $n = 6$; *L. campestris*, $n = 6$ & $2n = 12$; *L. multiflora*, $n = 18$ & $2n = 36$.—[D.H.K.]

606. Luzula.—See 605. Juncus.

607. Allium. Vet Brat, S., 1967, Genetic systems in Allium, 4. Balance in hybrids, *Hereditas*, **22,** 387-396.

612/1. Galanthus nivalis L.—See 614. Narcissus.

614. Narcissus. Fernandes, A., 1966, Nouvelles études caryologiques sur la section Jonquilla DC. du genre Narcissus L., *Bolm. Soc. broteriana, sér.* 2, **40,** 207-261.

614. Narcissus. Fernandes, A., 1966, Contribution à la connaissance de la génétique de l'hétérostylie chez le genre Narcissus L., 2. *Genet. iberica*, **17,** 216-239.

614. Narcissus. Fernandes, A., 1968, Keys to the identification of native and naturalized taxa of the genus Narcissus L., *Roy. Hort. Soc. Daffodil & Tulip Year Book*, **1968,** 37-66. Keys are provided to species, subspecies, hybrids and cultivars of *Narcissus*, together with data on origins, areas of natural distribution, naturalization, phenology, cytology, etc.—[D.H.K.]

614. Narcissus. Knowles, E., 1968, Cultivars of British wild plants, 36. Daffodil and Snowdrop, *Gdnrs' Chron.*, **163** (1), 117. Notes on the various cultivars of *Narcissus pseudo narcissus* and *Galanthus nivalis*. Most modern daffodils are of hybrid origin between subspecies of *Narcissus pseudo-narcissus* and western European species of *Narcissus*.—[D.H.K.]

614/1. Narcissus pseudonarcissus L. Brunerye, M., 1965, *Etude sociologique et ecologique des stations a Narcissus pseudo-narcissus L. des environs de Guincamp* (*C. du N.*). Memoire présenté a la Faculté des Sciences de Rennes pour obtenir de Diplôme d'Etudes Supérieures des Sciences Naturelles, Laboratoire Lucien Daniel, Botanique Appliquee et Géobotanique, Faculte de Sciences, Rennes. Pp. 68 + 25 figures. Studies on the biology, ecology and phytosociology of *Narcissus pseudonarcissus* near Guincamp, France.—[D.H.K.]

615. Sisyrinchium. Ingram, R., 1968, Breeding barriers in some species of Sisyrinchium, *New Phytol.*, **67,** 197-204. The cytology, breeding structure and relationships of several species of *Sisyrinchium* are discussed, particular attention being paid to the geographically separated populations of *S. bermudiana* found in America and Ireland. These are morphologically identical, but in crossing with a second taxon, with which neither is in contact, they show a physiological difference which may have arisen by the selection in the American population of barriers to interbreeding with a third taxon with which the Irish population has no contact. The situation revealed suggests a mechanism whereby a barrier to interbreeding could arise between populations or incipient species in non-contiguous areas.—[Author's summary]

618. Crocus. Skalínska, M., 1966, Badania cyto-taksonomiczne nad rodzajem Crocus L., *Acta Biol. cracov., ser. Bot.*, 9, **9,** 137-152. Cytotaxonomic studies on European *Crocus* species. *C. scepusiensis* (Rehm & Wol.) Borb. and its closest relative *C. heuffelianus* Herb. both had $2n = 18$. The two taxa are representatives of the collective species *C. vernus* (L.) Wulf in south-east Europe. It is considered that *C. scepusiensis* does not deserve specific rank and should be treated as an ecospecies of *C. heuffelianus*.

In the Alps the collective species *C. vernus* is represented by *C. albiflorus* Kit., ($2n = 8$), and *C. neopolitanus* (Ker-Gawl.) Steud., ($2n = 16$).—[D.H.K.]

621/1. Gladiolus illyricus Koch. Hamilton, A. P., 1967, The discovery and present status of Gladiolus illyricus Koch in Britain, *J. Durham Univ. Biol. Soc.*, **13,** [pp. 4]. *Gladiolus illyricus* was first discovered near Lyndhurst in the New Forest in 1886, and its subsequent discovery in Dorset and the Isle of Wight is also reviewed. It is assessed that the species has occurred in approximately 30 different sites since it was first discovered, but always in limited quantity over restricted areas. The large number of specimens in the national and in private herbaria is attributed to be one of the causes of its present great rarity and near extinction.—[D.H.K.]

624.→ Orchidaceae. Haes, E. C. M., 1967, Orchids in Britain, *Q. Bull. alp. Gdn Soc.*, **35,** 244-251. Notes on various species of British Orchidaceae.—[D.H.K.]

624.→ ORCHIDACEAE. Löw, U., 1967, Beitrag zum Inventur der Orchideen vorkommen im nordwestlichen Jura, *Bauhinia*, 3, 161-167. An annotated catalogue of the Orchidaceae recorded from the north-west Jura.—[D.H.K.]

624.→ ORCHIDACEAE. Lundqvist, Å., 1967, Orchideen Ölands, *Svensk bot. Tidskr.*, **61**, 463-493. Studies on various species and hybrids of the Orchidaceae on the Swedish island of Öland, including *Dactylorhiza incarnata* × *Gymnadenia conopsea*, *Dactylorhiza traunsteineri* × *Gymnadenia conopsea*, *Coeloglossum viride* × *Platanthera chlorantha*, *Gymnadenia conopsea* × *Platanthera bifolia*, and a dwarf form of *Platanthera chlorantha*.—[D.H.K.]

624.→ ORCHIDACEAE. Pijl, L. van der & Dodson, C. H., 1966, *Orchid Flowers. Their Pollination and Evolution.* Pp. [vi] + 1-214. Published jointly by the Fairchild Tropical Garden and the University of Miami Press. Coral Gable, Florida. Price $12.50. Although mainly devoted to tropical orchids a number of species found in Britain are included in this interesting study.—[D.H.K.]

624.→ ORCHIDACEAE. Reinhard, H. R., 1967, Übersicht über die Bastarde schweizerischer Orchideen mit Berücksichtigung der möglichen Kombinatienen, *Ber. schweiz. bot. Ges.*, **77**, 103-127. Orchid hybrids known from Switzerland are tabulated together with, where appropriate, their binary names. Details of extra-European distribution are also given.—[D.H.K.]

624.→ ORCHIDACEAE. Wildhaber, O. J. and Reinhard, H. R., 1967, Lateinische Diagnose zweier Orchideen bastarde, *Ber. schweiz. bot. Ges.*, **77**, 433. Descriptions are provided of *Orchis mascula* × *militaris* = *O.* × *wildhaberi* Reinhard, nom. nov., and *Anacamptis pyramidalis* × *Gymnadenia odoratissima* (L.) Rich. = × *Gymnacamptis odoratissima* Wildhaber, nom. nov.—[D.H.K.]

625/1. EPIPACTIS PALUSTRIS (L.) Crantz. Clarke, R. S., 1968, Status of Epipactis palustris at Magilligan, Co. Londonderry, *Ir. Nat. J.*, **16**, 26.

625/1. EPIPACTIS PALUSTRIS (L.) Crantz. Mead, J. W., 1966, Epipactis palustris dans les prealpes de Nice, *Riviera scient.*, **52/53**, 3.

625/6. EPIPACTIS PHYLLANTHES G.E.Sm. Pickess, B. P., 1967, A new orchid to Middlesex, *J. Ruislip Distr. nat. Hist. Soc.*, **15**, 18. Notes on the occurrence of *Epipactis phyllanthes* near Harefield, Middlesex.—[D.H.K.]

627/1. SPIRANTHES SPIRALIS (L.) Chevall. Davis, T. A. W., 1968, Spiranthes spiralis at Dale, Pembrokeshire, *Nature Wales*, **11**, 28.

628/2. LISTERA CORDATA (L.) R.Br. Mead, J. W., 1966, Contribution a l'étude des variation florales chez Listera cordata (L.) R.Br., *Riviera scient.*, **52/53**, 4.

637/1, LEUCORCHIS ALBIDA (L.) E. Mey. ex Schur. Ericson, J., 1967, Leucorchis albida (L.) E. Mey. åter funnen i Skåne, *Bot. Notiser*, **120**, 375-377. Notes on the occurrence of *Leucorchis albida* in the Swedish province of Skane. A list of associated species is also provided.—[D.H.K.]

642/2. ORCHIS MILITARIS L. Potucek, O., 1968, Eine neue Forme von Orchis militaris L., *Preslia*, **40**, 64-67. A new form of *Orchis militaris*—f. *vallis-leutrae*, is described from near Jena, and a key is provided to the identification of all known forms of the species.—[D.H.K.]

649/1. ARUM MACULATUM L. Reidl, H., 1967, Die infraspezifischen Einheiten von Arum maculatum in Mitteleuropa, *Phyton*, **12**, 159-168. Two subspecies of *Arum maculatum* are recognised in mid-Europe, viz. subsp. *maculatum*, with 3-6 whorls of upper staminoidal flowers, and subsp. *alpinum* (Schott & Kotschy) H. Riedl, comb. nov., with numerous whorls of staminoidal flowers. *A. maculatum* subsp. *danicum* Prime is regarded as a minor aberration of *A. maculatum* subsp. *maculatum* var. *immaculatum* Reichb., of little or no systematic importance despite its diploid chromosome number of $2n = 28$. A key is provided to the identification of the two subspecies and the varieties and forms of *A. maculatum* subsp. *maculatum*.

A. maculatum is very closely related to *A. italicum*, and hybrids between the two species probably occur.—[D.H.K.]

649/A. Arisarum proboscideum (L.) Savi. Fabbri, F., 1967, Dati cariologici sull'Arisarum proboscideum (L.) Savi, 2, *G. bot. ital.*, **101,** 249-251. Specimens of *Arisarum proboscideum* collected in Salerno, Italy, provided two different chromosome numbers, $2n = 28$ and $2n = 42$. In two localities in Tuscany only the number $2n = 28$ has been reported. Greater variation in the number of female flowers present in each spadix has been noted in the Salerno localities, the possible causes of this are discussed.—[D.H.K.]

650. Lemna. de Lange, L. & Segal, S., 1968, Overhet onderscheid en de oecologie van Lemna minor en Lemna gibba, *Gorteria*, **4,** 5-12. Flat forms of *Lemna gibba* occur rather commonly but differ from *L. minor* in various characters, e.g. in larger air cavities below the surface of the disc, 0·36 mm. in flat forms of *L. gibba* to 0·19 mm. in *L. minor*; the wall cavities of the former are also thicker, while *L. minor* is invariably more convex above and the shape of the disc is more elongate than in *L. gibba*. *L. minor* is also bright green in colour, while *L. gibba* is greyish green suffused with reddish purple.

The ecology of the two species is reviewed. *L. minor* occurs in relatively poor waters, especially those polluted by organic substances. *L. gibba* is found in more eutrophic habitats, with a relatively high chloride content, and thrives in fresh water especially after pollution with substances of an inorganic nature, e.g. industrial waste, etc. In habitats with a low chloride content it is sometimes associated with *Wolffia arrhiza*.

The flat growth forms of *L. gibba* may be referable to winter forms, young stages, or of plants growing in unfavourable habitats, e.g. brackish water.—[D.H.K.]

653. Typha. Bedish, J. W., 1967, Cattail moisture requirements and their significance to marsh management, *Am. Midl. Nat.*, **78,** 288-300. *Typha angustifolia* and *T. latifolia* were studied under field and greenhouse conditions in an attempt to determine optimum soil, moisture and water depth for germination, growth and vegetative reproduction.

Under greenhouse conditions seeds required flooding with water before germination took place, but no difference in germination percentage was noted by using different depths of water. Germination was reduced by 50% by storing seed for one year at room temperature and humidity before sowing.

Germination and vegetative reproduction appeared to be similar in saturated and moist soils.—[D.H.K.]

653. Typha. Crespo, S. & Pérez-Moreau, R. L., 1967, Revisión del generó Typha en la Argentina, *Darwiniana*, **14,** 413-429. A revision of *Typha* in Argentina. Four species are recognised—*T. latifolia*, *T. domingensis* Pers., *T. angustifolia* and *T. subulata* Crespo & Pérez-Moreau fils, sp. nov. Descriptions, synonymy and geographical data are provided, and illustrations of the four species are given.—[D.H.K.]

653. Typha. Smith, S. G., 1967, Experimental and natural hybrids in North American Typha (Typhaceae), *Am. Midl. Nat.*, **78,** 257-287. In North America *Typha latifolia*, *T. angustifolia* and *T. domingensis* Pers., occupy distinct but overlapping ecological and geographical ranges. All three plants are self-compatible and rhizomatous, and the study of leaf mucilage glands and gynophore hair apices have shown that these can be used as taxonomic characters. The three interspecific hybrids synthesized in the field in California are intermediate between their parents and similar to many putative hybrids noted in nature. *T. angustifolia*

× *latifolia* (*T.* × *glauca* Godr.), is widespread in temperate areas, and *T. domingensis* × *latifolia* is known from California, and has also been reported from southern Europe. Both these hybrids are invariably sterile. *T. angustifolia* × *domingensis* is known in hybrid swarms in California, and has also been recorded from other southern states. The hybrids are mostly fertile. Trihybrid populations occur in California and probably also in the south-eastern United States. All three species and their hybrids are diploids ($n = 15$). It appears that hybridization and introgression have resulted in the evolution of ecotypic races. The hybrids also appear to be better adapted than the parents in habitats with fluctuating water levels.—[D.H.K.]

654.→CYPERACEAE. Gregory, M. & Metcalfe, C. R., 1967, Bibliography for the anatomy of the Cyperaceae, *Notes Jodrell Lab. Roy. Bot. Gards. Kew.*, **5**, pp. 17.

654.→ CYPERACEAE. Le Cohu, M.-C., 1967, Interêt practique des Cyperacees, *Bot. Rhedonica*, **3**, 215-228. The author reviews the uses to man of various species of the Cyperaceae.—[D.H.K.]

654/2. ERIOPHORUM GRACILE Roth. Rose, F., 1967, Eriophorum gracile Roth new to Ireland, *Ir. Nat. J.*, **15**, 361-362. Records the discovery in 1966 of *Eriophorum gracile* growing abundantly in a wet oligotrophic swamp association on the south-west side of Lough Cregduff, Roundstone, Connemara. Details of associated species are provided. This is the first authentic record of the occurrence of the species in Ireland.—[D.H.K.]

654/2. ERIOPHORUM GRACILE Roth. Scannell, M. P., Synnott, D. M. & Webb, D.A., 1968, Eriophorum gracile in Ireland, *Ir. Nat. J.*, **16**, 12. *Eriophorum gracile* was recorded as new to Ireland from a single locality in Connemara in 1966. Investigations carried out by the authors in 1967 suggest that the species is probably not uncommon in the country as it was found in six additional localities, five in Connemara and one in Westmeath. In all the localities it was growing in shallow water or on a floating mat of vegetation. Details of associated species are given. Although not essentially a critical species it is pointed out that the species is very local in Britain and that many experienced botanists are unfamiliar with the plant, thus it has obviously been overlooked in Ireland and is likely to be found elsewhere in the country.—[D.H.K.]

655/7. SCIRPUS AMERICANUS Pers. Van der Berghen, C., 1967, Notes sur la végétation du sud-ouest de la France, 5. Les peuplements de Scirpus americanus Pers. dans le département des Landes, *Bull. Jard. Bot. Nat. Belg.*, **37**, 335-355. An ecological and phytosociological account of *Scirpus americanus* in south-west France, including the description of a new form—forma *arenosus* Van der Berghen, forma nov.—[D.H.K.]

656. ELEOCHARIS. Strandhede, S.-O., 1967, Eleocharis Subser. Eleocharis in North America. Taxonomical comments and chromosome numbers, *Bot. Notiser*, **120,** 355-368.

656. ELEOCHARIS. Strandhede, S.-O., 1967, Comments on some phytogeographical and biological problems in the complex of Eleocharis palustris, *Bot. Notiser*, **120,** 503-504.

663. CAREX. Dietrich, W., 1964, Carex flavella Krecz. und der Bastard mit C. demissa Hornem. [Ein Beitrag zur Cytologie der Carex flava-Gruppe], *Ber. bayer. bot. Ges.*, **37,** 101-103.

663. CAREX. Fagerström, L., 1967, Studien an der Carex Sektion Extensae Fr., *Acta Soc. Flora Fauna Fenn.*, **79** (3), 1-14. In this study of *Carex* Section *Extensae*, *C. hostiana* var. *froedinii* Fagerström, var. nov., is described from Turkey, *C. tumidicarpa* subsp. *cedercreutzii* Fagerström, subsp. nov. is described from the Azores, and *C. flavella* Krecz. is reduced to a synonym of *C. flava*.—[D.H.K.]

663. Carex. Le Cohu, M.-C., 1967, Recherches taxonomiques sur les Carex du Massif Armoricain, *Bot. Rhedonica*, **3**, 1-214. A monograph of the 53 species of *Carex* known to occur in the Massif Armoricain, France. Detailed descriptions are given of all the species, most of which occur in Britain, together with synonymy. Each species is also illustrated by a full page drawing, showing anatomical structure, etc., and a key is provided to the identification of the various species.—[D.H.K.]

663. Carex. Nilsson, Ö. & Hjelmqvist, H., 1967, Studies on the nutlet structure of south Scandinavian species of Carex, *Bot. Notiser*, **120**, 460-485. The nutlet structure of the *Carex* species occurring in south Scandinavia (about 70 species) has been investigated and a key has been worked out to facilitate a determination of subfossil and recent material. Some contributions to the taxonomy of the genus have also been obtained.—[Author's summary]

663. Carex.—See 605. Juncus.

663/55 × 57. Carex appropinquata × otrubae. Kraft, J., 1967, Carex appropinquata × otrubae funnen i Skåne, *Bot. Notiser*, **120**, 489-490. Two tufts of the hybrid *Carex appropinquata* × *otrubae* are reported near Malmö in the province of Skåne, Southern Sweden.—[D.H.K.]

663/61. Carex arenaria L. Juguet, M., 1967, Polyembryonie chez le Carex arenaria L., *Bull. Soc. bot. Fr.*, **113**, 448-452. The fairly frequent occurrence of two embryonic sacs in *Carex arenaria* brings about the production of twin albumens and embryos. These latter divide normally and seem able to produce viable seedlings.—[Author's summary, translated by E.B.B.]

663/76. Carex rupestris All. Roger, J. Grant, 1967, Carex rupestris All. in Glenfeshie Forest, Inverness-shire (v.c. 96, Easterness), *Trans. Proc. bot. Soc. Edinb.*, **40**, 337.

664.→ Gramineae. Alberda, T., 1966, Response of grasses to temperature and light, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 200-212.

664.→ Gramineae. Auquier, P. & Somers, Y., 1967, Recherches histo-taxonomiques sur le chaume des Poaceae, *Bull. Soc. r. Bot. Belg.*, **100**, 95-140. It is shown in this study of the structural characters of the culm of the family Poaceae that they have a real systematic value.—[E.B.B.]

664.→ Gramineae. Black, J. N., 1966, Competition within grass and cereal communities, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 167-178.

664.→ Gramineae. Clifford, H. T. & Goodall, D. W., 1967, A numerical contribution to the classification of the Poaceae, *Aust. J. Bot.*, **15**, 499-519.

664.→ Gramineae. Garowood, E. A., 1967, Studies on the roots of grasses, *Ann. Rep. Grassland Res. Stat. (Hurley)*, **1966**, 72-79.

664.→ Gramineae. Hardwicke, P., 1968, Decorative grasses, *Amateur Gard.*, **85**, 40. Decorative grasses recommended for garden culture include *Pennisetum longistylum*, *P. alopecuroides*, *P. villosum* (*P. longistyla*), *Lagurus ovatus*, *Briza maxima*, *Festuca ovina* 'glauca', *Eragrostis interrupta* (*E. elegans* hort.), *Stipa calamagrostis*, *S. pennata*, *Coix lachryma-jobii* and *Helictotrichon sempervirens* (*Avena candida*).—[D.H.K.]

664.→ Gramineae. Hodgson, J. H., 1966, Floral initiation in Alaskan Gramineae, *Bot. Gaz.*, **127**, 64-70. Studies of floral initiation in 13 different species of grasses found in Alaska, including *Poa pratensis*, *Festuca rubra*, *Deschampsia cespitosa* and *Hierochloe odorata*.—[D.H.K.]

664.→ Gramineae. James, M. & Groves, E. L., *Grasses* [revised by I. E. Finch, with extra drawings by I. E. Finch and E. Saunders, and a section on agricultural grasses by A. Voysey, and a key by P. B. Shaw]. School Natural Science Society Leaflet No. 30. Pp. 31. Headley Brothers, Ashford, Kent. Price 3/-, post free.

664.→ GRAMINEAE. Jewiss, O. R., 1966, The morphological and physiological aspects of growth of grasses during the vegetative phase, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 39-54.

664.→ GRAMINEAE. McClintock, D., 1967, The flowering of bamboos, *Jl. R. hort. Soc.*, **92,** 520-525. Notes on a number of species of the Bambusidae which have been known to flower in Britain.—[D.H.K.]

664.→ GRAMINEAE. Milthorpe, F. L. & Davidson, J. L., 1966, Physiological aspects of regrowth in grasses, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 241-254.

664.→ GRAMINEAE. Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses. Proceedings of the Twelfth Easter School in Agricultural Science, University of Nottingham*, 1965. Pp. [xii] + 359. Butterworths, London. Price 84/-.

664.→ GRAMINEAE. Monteith, J. L., 1966, Analysis of microclimate in cereals and grasses, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 123-137.

664.→ GRAMINEAE. Ryle, G. J. A., 1966, Physiological aspects of seed yield in grasses, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 106-117.

664.→ GRAMINEAE. Slavík, B., 1966, Response of grasses and cereals to water, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 227-240.

664.→ GRAMINEAE. Wellington, P. S., 1966, Germination and seedling emergence, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 3-19.

664.→ GRAMINEAE. Williams, R. F., 1966, Development of the inflorescence in Gramineae, in Milthorpe, F. L. & Ivins, J. D. (Editors), *The Growth of Cereals and Grasses*, 74-87.

665. PHRAGMITES. Clayton, W. D., 1967, Studies in the Gramineae, 14., *Kew Bull.*, **21,** 111-117. Includes a revision of *Phragmites* with descriptions, synonymy, and a key to the identification of species and subspecies.—[D.H.K.]

665/1. PHRAGMITES AUSTRALIS (Cav.) Steud. (*P. communis* Trin.). Iwata, E. & Ishizuka, K., 1967, Plant succession in Hachirogata Polder: Ecological studies on Common Reed (Phragmites communis), 1., *Ecol. Rev.* (*Japan*), **17,** 37-46.

669/3. GLYCERIA DECLINATA Bréb. Kellner, K., 1966, Glyceria declinata Bréb. in Bayerischen Wald, *Ber. bayer bot. Ges.*, **39,** 124-125. Notes on *Glyceria declinata* in Bavaria.—[D.H.K.]

670. FESTUCA. Malik, C. P., 1967, Hybridization of Festuca species within the genus Festuca, *Can. J. Bot.*, **45,** 1025-1029. Within the genus *Festuca* successful crosses have been made between five species belonging to the sections *Ovinae*, *Bovinae*, and *Scariosae*. These hybrids revealed close affinity among some of the species and in many cases the success of a cross depended upon a compatible genotype. Genetic evidence is presented to account for the morphological variability among some of the species. The role of introgression in the evolution of the *Festuca elatior* L. complex is discussed.—[Author's summary]

670. FESTUCA. Malik, C. P. & Thomas, P. T., 1967, Cytological relationship and genome structure of some Festuca species, *Caryologia*, **20,** 1-39. Studies on the genome structure of *Festuca pratensis*, *F. arundinacea* and *F. arundinacea* var. *glaucescens* Boiss.—[D.H.K.]

670/6. Festuca rubra L. Rytova, N. G., 1967, The biology of seed formation in Festuca rubra L., *Byull. Glavn. Bot. Sada Mosk.*, **64**, 76-79.

670/8. Festuca ovina L. Bidault, M., 1967, Etude biosystematique de quelques formes critiques de Festuca ovina L. subsp. sulcata Hack., *Bull. Soc. bot. Fr.*, **114**, 47-58. The comparative study—with the aid of biometric, cytological and ecological data—of a series of populations of *Festuca ovina* L. subsp. *sulcata* Hack. of the inner valleys of the Alps allows a precise account of the systematics of this taxon: a new variety—var. *guinocheti*—is described and additions are made to old diagnoses.—[Author's summary, translated by E.B.B.]

671. Lolium. Barbour, M., 1967, Early growth in annual and perennial ryegrass, *Agron. J.*, **59**, 204-205.

671. Lolium. Malik, C. P., 1967, Cytogenetic studies on the F_1 hybrid of Lolium multiflorum × rigidum and the species relationship in the genus Lolium, *Züchter*, **37**, 261-264.

671/1. Lolium perenne L. Ahloowalia, B. S., 1967, Colchicine induced polyploids in ryegrass, *Euphytica* (*Wageningen*), **16**, 49-60.

671/1. Lolium perenne L. Beddows, A. R., 1967, Lolium perenné L. (Biological Flora), *J. Ecol.*, **55**, 567-587.

671/1. Lolium perenne L. Thomas, R. L., 1967, Inter-population variation in Perennial Ryegrass, 1. Population means, *Heredity*, **22**, 481-498.

673/c. Puccinellia capillaris (Liljebl.) Jansen. Bullard, E. R., 1968, Puccinellia capillaris (Liljebl.) Jansen, *Bull. Orkney Fld Club*, **4**, 5. Notes on the occurrence and distribution of *Puccinellia capillaris* (*P. distans* var. *prostrata* (Beeby) Druce) in the Orkneys. This species which is widely distributed in Scandinavia, is also found in scattered localities in coastal areas in northern and mid-Scotland. It can be separated from its close relatives *P. maritima* by its very much smaller spikelets, and by the absence of creeping stolons, and from *P. distans* by its slightly longer apiculate lemmas and smaller, less branched inflorescences.—[D.H.K.]

676/1. Poa annua L. Koshy, T. K., 1968, Evolutionary origin of Poa annua L. in the light of karyotypic studies, *Can. J. Genet. Cytol.*, **10**, 112-118. From a karyotypic analysis of *Poa annua* ($2n = 28$) two large chromosomes, I and II, and one small chromosome, XIV, as well as three chromosome groups containing two, four and five chromosomes have been identified. From a comparison of the karyotype of *Poa annua* with that published of *P. exilis* ($2n = 14$) and *P. supina* ($2n = 14$), doubt is cast on the theory that *P. annua* is an allotetraploid of the two latter diploid species. The three chromosomes of *P. annua* that could be identified with certainty existed in homologous pairs indicating that the species could have originated from *P. exilis* or *P. supina* and one other, hitherto unidentified, species. It is suggested that further work on the karyotype of the diploid species might reveal further useful information on the evolutionary history of the species.—[Author's summary]

676/3. Poa bulbosa L. Sin'kovskii, L. P., 1966, Biology and ecology of the bulbous meadow grass (Poa bulbosa L.) in the arid regions of the southern part of central Asia, *Akad. Nauk. Tadzh. SSSR Otd. Biol. Nauk Izv.*, **1** (22), 54-70.

676/4. Poa alpina L. Müntzing, A., 1967, Some main results from investigations of accessory chromosomes, *Hereditas*, **57**, 432-438. Studies on accessory chromosomes in several species, and in particular in *Poa alpina* and *Secale cereale*.—[D.H.K.]

676/10. Poa pratensis L. Umaerus, M. & Åkerberg, E., 1968, Preliminary studies on spontaneous chimaera formation in Poa pratensis L., *Hereditas*, **59**, 221-228.

681. MELICA. Larsson, B. M. P., 1967, Melica ciliata funnen vid Vänern i Västergöland, *Svensk bot. Tidskr.*, **61**, 425-441. The discovery in 1964 of the south European species *Melica ciliata* L. in an apparently native habitat on a shore cliff at Lake Vänern in reported. This is the most western locality so far reported for the species in Sweden, and ecological data and details of associated species are given.—[D.H.K.]

683. BROMUS. Mitchell, W. W., 1967, Taxonomic synopsis of Bromus section Bromopsis (Gramineae) in Alaska, *Can. J. Bot.*, **45**, 1309-1313. Six species, including *Bromus inermis*, are recognised in this revision of *Bromus* section *Bromopsis* in Alaska. The species are described and a key is given to their identification. Maps illustrate the distribution of the various species.—[D.H.K.]

683. BROMUS. Smith, P., 1968, Serological distinctness of Bromus pseudosecalinus P. Smith, sp. nov., *Feddes Rep.*, **77**, 61-64. Immunoelectrophoretic studies of the seed proteins of material provisionally referred to *Bromus secalinus* var. or f. *hirtus* have revealed that it is serologically distinct from *B. secalinus*. The plant has many of the characters of *B. secalinus* fitting that species to life as a contaminant of cereal fields, but the floret and seed sizes are much smaller, and the sheaths are normally hairy. In Britain the plant appears to contaminate small-seeded pasture grasses which are sown on roadsides. The chromosome number of this plant is $2n = 14$, unlike typical *B. secalinus* which has $2n = 28$. The plant seems to have been introduced into Britain, but its native distribution is not known. In view of its distinctive morphology and its serological difference from *B. secalinus* and other bromes, it is proposed to name it as a new species: **B. pseudosecalinus** P. Smith, sp. nov.—[Author's summary]. This new species was described from material found growing alongside a road at Halesowen, Worcestershire, in 1963, but there are numerous records of *B. secalinus* var. or f. *hirtus* from many other parts of Britain.—[D.H.K.]

683/3. BROMUS BENEKENII (Lange) Trimen. Chevassus, P., 1968, Un Brome meconnu en Bourgogne et en Franche-Comté: Bromus benekenii (Lange) Trimen, *Monde des Plantes*, **63** (359), 14-15.

690/1. GAUDINIA FRAGILIS (L.) Beauv. O'Sullivan, A. M., 1967, Gaudinia fragilis (L.) P. Beauv., in Limerick grassland. *Ir. Nat. J.*, **15**, 343-345. *Gaudinia fragilis*, a Mediterranean species, has been found growing in old permanent pastures in three places in Co. Limerick. Details are given of associated species, etc., and it is suggested that the grass may have originally been introduced by Palatine settlers in the early 18th century.—[D.H.K.]

691. TRISETUM. Chrtek, J., Trisetum griseovirens Lindb. sein wert und seine Stellung innerhalb der Gattung Trisetum, *Bull. Soc. Sci. nat. phys. Maroc.*, **46**, 175-180. Notes on North African species of *Trisetum*.—[D.H.K.]

692. AVENA. Baum, B. R., 1968, Delimitation of the genus Avena (Gramineae), *Can. J. Bot.*, **46**, 121-132. An historical sketch of the different opinions concerning the generic limits of *Avena* and its relationships among other closely related genera of the tribe *Aveneae* is given. Advancement indixes of *Avena* and its closest allies were calculated. It was found that *Avena* possesses many primitive characters and in this respect is most closely allied to *Arrhenatherum* and *Helictotrichon*. The genera *Amphibromus*, *Deschampsia*, *Trisetum* and *Ventenata* possess a greater number of more advanced characters and are considered to be more distantly allied with *Avena*. Diagnostic characters for *Avena* have been assessed. *Avena macrostachya*, a perennial species, has been included together with the annual oats within the generic limits of *Avena*. A full description of the genus is given. —[Author's summary]

692. Avena. Marenah, L. J. & Holden, J. H. W., 1967, Karyotype studies in Avena, I. The karyotype of Avena sativa Cultivar Cosson, *Chromosoma*, **22,** 456-464.

692. Avena. Rajhathy, T. & Thomas, H., 1967, Chromosomal differentiation and speciation in diploid Avena, 3. Mediterranean wild populations, *Can. J. Genet. Cytol.*, **9,** 52-68. A number of *Avena* species which have occurred as adventives in Britain are included in this account.—[D.H.K.]

692. Avena. Rajhathy, T., Zillinsky, F. J. & Hayes, D. J., 1966, *A collection of wild oat species in the Mediterranean region, Ottawa Research Station Publ.* Pp. 25.

692/1. Avena fatua L. Sexsmith, J. J., 1967, Varietal differences in seed dormancy of wild oats, *Weeds*, **15,** 252-255. Seeds of *Avena fatua* collected from various localities in south-western Alberta, Canada, in 1959 and 1962 showed considerable variation in dormancy both within and among varieties. The var. *pilosissima* was the most dormant, the vars. *glabrata* and *intermedia* showed about the same dormancy, and the var. *vilis* produced the least dormant seeds. The effect of germination of seeds of the various varieties after storage is also reviewed. —[D.H.K.]

696. Deschampsia. Weihe, K. von & Reese, G., 1968, Deschampsia wibeliana (Sonder) Parlatore. Beiträge zur Monographie einer Art des Tidegebietes, *Bot. Jb.*, **88,** 1-43. The morphology, anatomy, cytology and distribution of *Deschampsia wibeliana* have been studied from material from several riverside localities between Hamburg and St. Margarethen. Few characters were found to be constant for separating the species from *D. cespitosa* apart from leaf anatomy, spikelet structure and earlier flowering period. The taxonomic status of *D. wibeliana* is reviewed with regard to related species.—[D.H.K.]

696/3. Deschampsia flexuosa (L.) Trin. Hackett, C., 1967, Ecological aspects of the nutrition of Deschampsia flexuosa (L.) Trin., 3. Investigation of phosphorus requirement and response to aluminium in water culture and a study of growth in soil, *J. Ecol.*, **55,** 831-840.

697/1. Aira praecox L. Newman, E. I., 1967, Response of Aira praecox to weather conditions, 1. Response to drought in spring, *J. Ecol.*, **55,** 539-556. Observations on *Aira praecox* in East Anglia were carried out for a number of years; data on inflorescence emergence were recorded for 9 years between 1958 and 1966, and on seed production for 7 years. In 1960 a drought before and during the time of inflorescence emergence resulted in many inflorescences failing to emerge and seed production to be reduced. For several years following 1960 progeny appeared to be smaller. During other years in the study moisture conditions in the spring appeared to have no effect on inflorescence emergence or seed production. It is concluded that *A. praecox* appears to be highly resistant to soil moisture variation during flower and seed development.—[D.H.K.]

700/4. Calamagrostis scotica (Druce) Druce. Corner, R. W. M., 1967, Calamagrostis scotica in southern Scotland (v.c. 80), *Trans. Proc. bot. Soc. Edinb.*, **40,** 336-337.

701. Agrostis. Widen, K.-G., 1967, Om typifieringen av släktet Agrostis L., *Bot. Notiser*, **120,** 508-510.

701/5. Agrostis stolonifera L. Splittstoesser, W. E. & Hopen, J. E., 1967, Response of bent grass to Siduron, *Weeds*, **15,** 82-83.

701/5. Agrostis stolonifera L. Younger, V. B., Lunt, O. R. & Nudge, F., 1967, Salinity tolerance of seven varieties of creeping bent grass, Agrostis palustris Huds., *Agron. J.*, **59,** 535-556.

706/1. Lagurus ovatus L. Gombi, O. V., 1967, Seed dispersal and germination in 'Lagurus ovatus' var. vestitus in comparison with 'L. ovatus' var. ovatus, *Webbia*, **22**, 75-81.

707/2. Phleum pratense L. Lambert, D. A., 1967, The effects of nitrogen and irrigation on timothy (Phleum pratense) grown for production of seed, 1. Negative growth, *J. Agric. Sci.*, **69**, 225-230: 2. Reproductive growth and yield of seed, *loc. cit.*, **69**, 231-239.

707/4. Phleum phleoides (L.) Karst. Bosemark, N. O., 1967, Edaphic factors and the geographical distributions of accessory chromosomes in Phleum phleoides, *Hereditas*, **57**, 239-262. Extensive sampling of natural populations of *Phleum phleoides* on the Baltic island of Öland revealed that in spite of the small size of the island and the wide distribution of *P. phleoides* there, a marked geographical distribution of plants with accessory chromosomes was present.—[D.H.K.]

708/2. Alopecurus pratensis L. Etherington, J. R., 1967, Soil water and the growth of grasses, 2. Effects of soil water potential on growth and photosynthesis of Alopecurus pratensis, *J. Ecol.*, **55**, 373-380.

711. Hierochloe. Weimarck, G., 1967, Apomixis in Hierochloë monticola (Gramineae), *Bot. Notiser*, **120**, 448-455.

712. Anthoxanthum. Hedberg, I., 1967, Cytotaxonomic studies on Anthoxanthum odoratum L. s. lat., 2. Investigations of some Swedish and of a few Swiss population samples, *Symb. bot. upsal.*, **18** (5), 1-88 + 8 plates. Studies on the distribution and variation of the two cytotypes of *Anthoxanthum odoratum* L. *sensu lato* (viz. *A. odoratum* L. *sensu stricto*, $2n = 20$, and *A. alpinum* Löve & Löve, $2n = 10$), based on the examination of more than 1,500 specimens from some 250 populations, chiefly in Sweden. Although differing in their main areas of distribution the two grow together over a large part of northern Sweden with apparent differences in ecological requirements. The ecology, dispersal, phenology and morphology of the two taxa are described in detail.

Recent studies in other parts of Europe are reviewed, and it is pointed out that the usual morphological character used in distinguishing the two cytotypes in Sweden and elsewhere, viz., hairiness, is invalid for separating material from the Swiss Alps. Spontaneous triploid hybrids are reported both from otherwise pure diploid populations and also from mixed ones. Considerable differences between the results of the present investigation and recent studies elsewhere in Europe are noted, and it is concluded that the diploid populations outside Scandinavia need further study in order to clarify the question of nomenclature and typification. It is also pointed out that recent investigations revealing a very close relationship between diploid *A. odoratum* (*A. alpinum*) from Scandinavia and *A. nipponicum* Honda from Japan makes a broader study desirable.—[D.H.K.]

716. Spartina. Marchant, C. J., 1968, Evolution in Spartina (Gramineae), 2. Chromosomes, basic relationships and the problem of S. × townsendii agg., *J. Linn. Soc. Bot.*, **60**, 381-409. An intensive study of the cytology and sexual behaviour of the classical *Spartina* × *townsendii* agg. and their putative parents, in southern England reveals a more complex chromosomal situation than had previously been reported, including aneusomaty in Southampton *S. alterniflora* populations and in *S.* × *townsendii* agg. Chromosome numbers are $2n = 60$ and 62 for *S. maritima* and *S. alterniflora* respectively, and $2n = 62$ and $2n = 120$, 122 and 124 (chromosome races) for *S.* × *townsendii* F_1 and amphidiploid derivatives respectively. These numbers, though their summation is less precise than hitherto reported, still support the hybridity and amphidiploid origin of *S.* × *townsendii* agg. and the process is further confirmed by meiotic pairing data and the discovery of wild backcross hybrids ($2n = c.\ 90$ and $2n = 76$) near the site of origin at Southampton. The $2n = 62$ chromosome number of *S.*

alterniflora out of line with the $x = 10$ base number of the genus, is explained as a polysomic condition ($2n = 60 + 2$) and needs further investigation with a study of North American populations.

It is suggested that chromosome races found in *S.* × *townsendii* Amphidiploid will provide adaptive variation in this highly significant and successful amphidiploid.—[Author's summary]: 3. Species, chromosome numbers and their taxonomic significance, *loc. cit.*, **60,** 411-417. The chromosome numbers of nine species of the genus *Spartina* have been determined and their meiotic pairing has been examined. All numbers are referable to either $2n = 40$ (*S. pectinata*, *S. patens*, *S. cynosuroides*, *S. gracilis*, *S. bakeri* and *S. arundinacea*), $2n = 60$ (*S. maritima*), or $2n = 62$ (*S. alterniflora* and *S. glabra*). No intraspecific polyploids have been found. Supernumerary or B-chromosomes occur rarely in *S. pectinata*. Hence the basic chromosome number is deduced as being $x = 10$ for these species in contrast to former reports of $x = 7$. The implications of the new basic number with respect to taxonomic position are pointed out.—[Author's summary]

716/2 × 1. SPARTINA × TOWNSENDII H. & J. Groves. Large, N. F., 1967, The significance of Spartina townsendii at Aust Cliff, *Proc. Cotteswold Nat. Fld Club*, **35,** 55-58. Aust Cliff [on the east bank of the Severn Estuary, ten miles north of Bristol] provides one of the rare instances where slope development has proceeded at a sufficiently fast rate and has been sufficiently well documentated for its progress to be traced. Salt marsh development is seen to be the necessary prerequisite for the existence of a permanent talus slope against the cliff face, and this development has been initiated by *Spartina* × *townsendii*.—[Author's summary]

720/B. BECKMANNIA. Meijden, R. van der, 1967, Het geslacht Beckmannia Host in Nederland, *Gorteria*, **3,** 209-211. Two adventive species of the genus *Beckmannia* have been found in the Netherlands—*B. eruciformis* (L.) Host and *B. syzigachne* (Steud.) Fern.—they are described and a key is given to their identification.—[D.H.K.]

720/C. CENCHRUS. Caro, J. A. & Sanchez, J. A., 1967, Las especies de Cenchrus (Gramineae) de la Republica Argentina, *Kurtziana*, **4,** 95-129. Systematic studies on the five species and four varieties of *Cenchrus* known to occur in the Republic of Argentina. Illustrations are provided of the species, some of which have occurred in Britain as 'wool aliens'.—[D.H.K.]

720/S. SASA. Susuki, S., 1967, Taxonomical studies on the Bambusaceous genus Sasa Makino et Shibata, 3, *Jap. J. Bot.*, **19,** 419-457. A continuation of the revision of the genus *Sasa*.—[D.H.K.]

720/St. STIPA. Martinovský, J. O., 1967, Zur Taxonomie und Verbreitung von Stipa paradoxa (Junge) P. Smirnov und Stipa crassiculmis P. Smirnov, 10. Beitrag zur Kenntnis der Federgrassippen der Sektion Pennatae, *Bot. Jb*, **87,** 383-398.

720/St. STIPA. Martinovský, J. O., 1967, Neue submediterrane Stipa-Arten und die taxonomisch Einteilung der Federgrassippen der serie Pulcherrimae Martinovský, 11. Beitrag zur Kenntnis der Federgrasser der Sektion Pennatae, *Preslia*, **39,** 260-275.

720/St. STIPA. Martinovský, J. O., 1967, Klíc k urcení stredoevopských kaylus taxomickỳmi, fytogeografickými a ekologickými poznamkami. 14. Príspevek k poznaní evropských kavylu, *Zprávy Cesk. Bot. Spolecn. CSAV*, **2,** 77-97. The taxonomy, ecology and phytogeography of the European species of *Stipa* Section *Pennatae* are discussed, and a key is provided to the identification of the various species.—[D.H.K.]

TOPOGRAPHICAL

0, Sarnia: Guernsey. Jee, N., 1967, *Guernsey's Natural History*. Pp. 100. Guernsey. Obtainable from the author at La Houguette, Castel, Guernsey, Channel Islands. Price 8/6, post free. Includes many notes on the flora of the island.—[D.H.K.]

0, Sarnia: Guernsey. McClintock, D., 1968, The plants of Guernsey, *Gdnrs' Chron.*, **163** (13), 12-13; *loc. cit.*, **163** (14), 9-11; *loc. cit.*, **163** (15), 16-17. Notes on a number of the more interesting native and adventive plants found in Guernsey.—[D.H.K.]

0, Sarnia: Jersey. Le Sueur, F., 1967, Botanical report, *Soc. Jers. Ann. Bull.*, **19**, 182-184. Lists the more interesting records made in Jersey during 1966.—[D.H.K.]

1-2, Cornwall & 3-4, Devon. *Devonshire Trust for Nature Conservation*, 1967, *Conservation and the Torrey Canyon*. Pp. 72. Plymouth. A series of papers on the effects of oil pollution resulting from the Torrey Canyon disaster on the fauna and flora of the coasts of south-west England.—[D.H.K.]

3, S. Devon. Courtney, F. M. & Hardy, D. A., 1967, Wistman's Wood Forest Nature Reserve: a preliminary report of an ecological survey, *J. Devon. Trust. Nat. Conserv.*, **1**, 533-540.

3, S. Devon. Dalby, D. H., 1966, Mosses and ferns in Kent's Cavern, *Trans. Proc. Torquay nat. Hist. Soc.*, **14**, 118-123.

3, S. Devon. Ivimey-Cook, R. B. & Proctor, M. C. F., 1967, Factor analysis of data from an East Devon heath: a comparison of principal component and rotated solutions, *J. Ecol.*, **55**, 405-413.

3, S. Devon. Phillips, E. N. Masson, 1966, Tod Moor, near Westlake, Ermington: a botanical note, *J. Devon. Trust. Nat. Conserv.*, **1**, 402. A short note on interesting *Dactylorhiza* populations, consisting of species and hybrids, occurring on Tod Moor.—[D.H.K.]

3, S. Devon. Proctor, M. C. F., 1965, The Bovey Basin and Chudleigh Knighton Heath, *J. Devon. Trust. Nat. Conserv.*, **1**, 260-263. A short account of the geology and natural history of the Bovey Basin and Chudleigh Knighton Heath, the bed of an ancient lake lying in a depression between Dartmoor, Teignmouth and Torbay.—[D.H.K.]

3, S. Devon. Wilson, M. A., 1967, Saving the Plymouth Pear, *J. Devon. Trust Nat. Conserv.*, **1**, 481-482. Notes on attempts to save plants of *Pyrus cordata* growing in a hedge at Egg Buckland when the area was threatened by industrial development.—[D.H.K.]

3, S. Devon. Wilson, M. A., 1967, Some plants of Plymouth Hoe, *J. Devon. Trust Nat. Conserv.*, **1**, 522-524. Plymouth Hoe has now been converted into a well kept park but there are still a few rocky corners and relatively untended natural slopes that support a limestone flora. Much of the turf still retains submaritime species, e.g. *Trifolium scabrum*, *Medicago arabica*, *Poa bulbosa*, and the famous adventive thistle, *Carduus pycnocephalus*, persists in quantity and is protected by the City Council. The pink-flowered Bladder Campion (*Silene vulgaris* var. *commutata*), another long-established adventive, is also still firmly entrenched, and *Eryngium campestre* still flourishes at Devil's Point, Stonehouse, where it was first noted by John Ray in 1662.—[D.H.K.]

3-4, Devon. Hayward, J. J., 1967, Fifty-ninth report on botany, *Rep. Trans. Devon. Assoc. Advmt. Sci.*, **99**, 305-306.

6, N. SOMERSET. Willis, A. J., 1967, The vegetation of Calcott Heath, Somerset, *Proc. Bristol Nat. Soc.*, **31**, 297-304. Notes on the flora of Calcott Heath, on the Somerset Turf Moor, west of Glastonbury. The vegetation has developed under eutrophic, near neutral conditions on peat which lies close to the water table. The area possesses a diverse flora including such rare species as *Cladium mariscus*, *Lathyrus palustris* and *Carex lasiocarpa*, all of which are locally plentiful.—[D.H.K.]

6, N. SOMERSET & 34, W. GLOUCESTER. Willis, A. J., 1967, Bristol botany in 1966, *Proc. Bristol Nat. Soc.*, **31**, 239-248. Gives details of the more interesting species found in the Bristol area in 1966. Of particular interest is **Calystegia pulchra × sepium** found on waste ground at Kingswood, Bristol by Dr D. Munro Smith and determined by Dr R. K. Brummitt.—[D.H.K.]

7-8, WILTS. Grose, D., 1967, Wiltshire Plant Notes (27), *Wilts. archaeol. nat. Hist. Mag.*, **62**, 168-170.

9, DORSET. Chapman, S. B., 1967, Nutrient budgets for a dry heath ecosystem in the south of England, *J. Ecol.*, **55**, 677-689. Studies on heathland in the Poole Basin.—[D.H.K.]

9, DORSET. Good, R. d'O., 1967, Botany, *Proc. Dorset. nat. Hist. archaeol. Soc.*, **88**, 44-45. Notes on some of the more interesting records made in 1966. Information is also given on the distinguishing characters for separating *Ulex gallii* and *U. minor*.—[D.H.K.]

9, DORSET, 10, ISLE OF WIGHT, 11-12, HANTS. Anon, 1968, Flora, *Ann. Rep. Southampton nat. Hist. Soc.*, **1967**, 12-15. Details are given, together with localities, of the more uncommon plants noted in 1967 in the area covered by the Southampton Natural History Society.—[D.H.K.]

9, DORSET & 11, S. HANTS. Anon., 1968, Botany: Plant notes from the records, *Proc. Bournemouth Nat. Sci. Soc.*, **57**, 30.

11, S. HANTS. Tubbs, C. R. & Jones, E. L., 1964, The distribution of gorse (*Ulex europaeus* L.) in the New Forest in relation to former land use, *Pap. Proc. Hampsh. Fld Club*, **23**, 1-10.

13-14, SUSSEX. Christian, G., 1967, *Ashdown Forest*. Pp. [vii] + 1-78 + map. The Friends of Ashdown Forest. Lewes. Price 21/-. Flowers of the Forest, pp. 46-49.

13-14, SUSSEX. Jenks, O. C., 1968, The vegetation of Ashdown Forest: some historical notes, *Q. Jl. For.*, **62**, 46-52.

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17, SURREY. Anon, 1968, British flora on compost heaps, *J. Kew Guild*, **8**, 776-777. A list of species noted growing among the soil, compost and manure heaps within the bounds of the Rick Yard, Arboretum South, Royal Botanic Gardens, Kew. Most of the species noted are common lowland weeds but more unusual members include *Acer platanoides*, *Carex echinata* and *Rumex maritimus*.—[D.H.K.]

18, S. ESSEX. Jermyn, S. T., 1966, The gardens of Warley Place, *Essex Nat.*, **31**, 370-375. Notes on the survival and spread of various cultivated species in the gardens of Worley Place, formerly of great renown, but which have now been derelict for about 30 years.—[D.H.K.]

18, S. ESSEX. Jermyn, S. T., 1967, The Tri-Folinius or Clover Family, *S. Essex Nat.*, **1966**, 15-17. A list of the species of the Leguminosae recorded from South Essex, with details of frequency, soil, and habitat preferences.—[D.H.K.]

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21, MIDDLESEX. Pickess, B. P., 1966, A new orchid to Middlesex, *J. Ruislip Distr. nat. Hist. Soc.*, **15,** 18. Notes on the discovery of *Epipactis phyllanthes* near Harefield.—[D.H.K.]

22, BERKS, 23, OXON & 24, BUCKS. Marcan, B., 1967, Botanical records, *Middle-Thames Nat.*, **19,** 22-23.

24, BUCKS. Pickess, B. P. & Snow, W. F., 1967, A study of the Section of the River Misbourne near Denham Village, Buckinghamshire, *J. Ruislip Distr. nat. Hist. Soc.*, **16,** 42-53. An ecological and phytosociological account of a section of the river Misbourne, a small swift flowing stream which is one of the relatively few unpolluted streams in the London area.—[D.H.K.]

25, E. SUFFOLK. Anon., 1967, Classified Reports: Botanical, *Lowestoft Fld Club Ann. Rep.*, **3** (1), 20-21. Details are given of some of the more interesting phanerogams found in the Lowestoft area during 1966.—[D.H.K.]

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29, CAMBRIDGE. Bingley, F. J. & Walters, S. M., 1966, *Wicken Sedge Fen. A Topographical and Botanical Guide. Guide to Wicken Fen.* Pp. 8. National Trust: Wicken Fen Committee. Price 1/-. A detailed guide to the more typical plants of Wicken Sedge Fen, with 26 drawings by John Nash, R.A.—[D.H.K.]

29, CAMBRIDGE. Perring, F. H., 1968, Vascular plant records, *Nature Cambs.*, **11,** 36-37.

29, CAMBRIDGE. Walters, S. M., 1967, *List of the Vascular Plants of Wicken Fen. Guides to Wicken Fen No.* 3. Pp. 8. National Trust: Wicken Fen Local Committee. Price 6d. A list arranged alphabetically under generic names of the vascular plants which have been recorded at Wicken Fen since 1940.—[D.H.K.]

32, NORTHANTS. Gent, Mrs G. M. *et al.*, 1966, Botanical records, *J. Northampt. nat. Hist. Soc.*, **35,** 474-480.

32, NORTHANTS. Payne, F. D. & Gent, Mrs G. M., 1967, Botanical records, 1966, *J. Northampt. nat. Hist. Soc.*, **35,** 569-572.

33-34, GLOS. de Vesian, D. E., 1967, Botanical records for Gloucestershire, 1966, Phanerogams and cryptogams, *Proc. Cotteswold Nat. Fld Club*, **35,** 66-73.

34, W. GLOS. Large, N. F., 1967, The significance of Spartina townsendii at Aust Cliff, *Proc. Cotteswold Nat. Fld Club*, **35,** 55-58.

37, WORCS. Fincher, F., 1966, Notes on Worcestershire plants, *Trans. Worcs. Nat. Club*, **11,** 276-281.

38, WARWICK. Anon, 1966, Notes from the botanical section, *Rep. Warwick nat. Hist. Soc.*, **12,** 8.

38, WARWICK. Dawson, R. B., 1966, The rescue of the Yellow Star of Bethlehem, *Rep. Warwick nat. Hist. Soc.*, **12,** 8-9. Notes on the transfer of bulbs of *Gagea lutea* from Chelmsley Wood, near Coleshill, which is scheduled to be destroyed by the development by Birmingham Corporation of a satellite town of 1,500 acres.

Prior to the transfer of plants, soil samples from Chelmsley Wood were analysed at Birmingham University, and a study was made of associated plant species. Subsequently a search was made for woods with similar soils and ground cover. Two woods, Whichford and Knavenhill, were considered to be very suitable and in October 1965 many bulbs and bulbils were transplanted to one of them. It was proposed to transplant further material to the other wood at a later date. —[D.H.K.]

Wales. Jones, Ll. I., 1967, Studies on hill land in Wales, *Univ. Coll. Wales Aberystwyth Welsh Plant Breed. Stat. Techn. Bull.*, **2.** Pp. 179. Price 10/-. Ecological studies on Welsh hill land, including a survey of sheepwalks, response of hill swards to grazing management, influence of lime and fertilizers on hill grazing, etc.—[D.H.K.]

35, Monmouth, 42, Brecon, 43, Radnor, 44, Carmarthen, 45, Pembroke, 46, Cardigan, 47, Montgomery, 49, Caernarvon & 52, Anglesey. Davis, T. A. W. (Compiler), 1968, Field Notes: Plants, *Nature Wales*, **11,** 28-33. Contains notes on *Dryopteris assimilis* in Wales, *Spiranthes spiralis* in Pembrokeshire, and a number of new vice county records.—[D.H.K.]

41, Glamorgan. Etherington, J. R., 1967, Studies of nutrient cycling and productivity in oligotrophic ecosystems, 1. Soil potassium and wind-blown sea-spray in a South Wales dune grassland, *J. Ecol.*, **55,** 743-752. Analysis of soils from areas dominated by *Festuca rubra* from fore dunes, and from old dunes supporting *Calluna vulgaris* at Kenfig Burrows showed that calcium is progressively leached from the surface layers of the soil, but there is no evidence of a similar leaching of potassium. The effects of sea spray on the soils is also reviewed.—[D.H.K.]

45, Pembroke. Davis, T. A. W., 1966, Spiranthes spiralis at Dale, Pembrokeshire, *Nature Wales*, **11,** 28. Notes on the occurrence of *c.* 1,000 plants of *Spiranthes spiralis* above Westdale Bay in August 1966; nearly as many plants were noted on 26 August 1967, but on 9 September 1967 not a single plant could be found. This is attributed to grazing by cattle. Notes are provided on associated species and on the fluctuations of the species. It is suggested that grazing and mowing are often responsible for the plant failing to develop seed, and attention is drawn to its frequent occurrence on lawns when they are left uncut.—[D.H.K.]

46, Cardigan. Moore, P. D., 1968, Human influence upon vegetational history in north Cardiganshire, *Nature*, **217,** 1006-1009. Pollen analytical investigations at Borth Bog and upon the upland blanket peats of Cardiganshire have elucidated the role of man as a factor influencing the development and destruction of the vegetation of the area. The times of most severe forest destruction appear to have been in the Iron Age/Roman period and the fourteenth to eighteenth centuries. —[D.H.K.]

49, Caernarvon. Roberts, R. H., 1960, Further records of the Dwarf Buckler Fern in Wales, *Nature Wales*, **11,** 29.

55, Leics. Anon., 1967, Flowering Plants, *Heritage* (*Quart. Bull. Loughborough Nat. Club*), **27,** 12-15.

55, Leics. Gamble, P. H., 1967, Flowering plants and Flowerless Plants, *Heritage* (*Quart. Bull. Loughborough Nat. Club*), **26,** 13-17. Gives details of some of the more interesting records made in the Loughborough area in 1967.—[D.H.K.]

55, Leics. Green, F. R., 1967, Recorders' Reports: Flowering Plants and Ferns, *Ann. Rep. Loughborough Nat. Club.*, **1967,** 9-10.

55b, Rutland. M[essenger], K. G., 1966, Flora of Rutland, Progress Report, 1965, *Rep. Uppingham Sch. Fld Club*, **20,** 9-15.

55b, Rutland. Messenger, K. G., 1967, The railway flora of Rutland, *Rep. Uppingham Sch. Fld Club*, **21,** 35-45. A detailed study of railway tracks, banks, goods yards, etc., in Rutland, has produced a total of 370 different species, 53 of which are rare or infrequent in the county, and 22 of which are known only from railway habitats; these include *Gymnocarpium dryopteris*, *Diplotaxis muralis*, *Thlaspi perfoliatum*, *Cerastium atrovirens*, *Minuartia hybrida*, *Hieracium salticola*, *H. vagum*, *H. strumosum*, *H. diaphanum*, *Vulpia myuros*, *Aira praecox* and *Apera spica-venti*.

The number of species found on railway property is considerably greater than the number found in other habitats of comparable area. Railway sites of particular interest are described in detail.—[D.H.K.]

57, DERBY. Grime, J. P. & Hutchinson, T. C., 1967, The incidence of lime-chlorosis in the natural vegetation of England, *J. Ecol.*, **55,** 557-566.

61-65, YORKS. Eyre, S. R., 1966, The wild vegetation of northern England, *Rep. Yorks. phil. Soc.*, **1966,** 42-44.

63, S.-W. YORK. Rorison, I. H., 1967, A seedling bioassay on some soils in the Sheffield area, *J. Ecol.*, **55,** 725-741. Experimental investigations to determine the effect of soil factors on the germination and seedling establishment of potential invasive species in the Sheffield area. Seven species representing a range of ecological tolerance from calcicole to calcifuge were grown on nine soils of differing chemical and physical characteristics with varying results.—[D.H.K.]

64, MID-W. YORK. Williams, J. T. & Varley, Y. W., 1967, Phytosociological studies on some British grasslands, 1. Upland pastures in northern England, *Vegetatio*, **15,** 169-189. A study of plant communities in relation to site factors in upland pastures near Malham.—[D.H.K.]

66, DURHAM. Mullin, L., 1967, Some exotic weeds of South Shields parks, *Vasculum*, **52,** 14. The South European species *Smyrnium perfoliatum* is widespread in the Marine Parks, South Shields, and as the parks were originally constructed on ballast hills it seems possible that the plant originated from that source. Other adventives naturalised in South Shields parks are *Rumex alpinus*, *R. scutatus*, *R. sanguineus* var. *sanguineus*, *Sisymbrium strictissimum*, *Allium triquetrum*, *Arum italicum*, *Trachystemon orientalis*, and most unusual of all several well established patches of *Carex montana*. The writer also points out that recent records of *Bupleurum rotundifolium* from the north of England are probably referable to *B. lancifolium*, and gives the salient characters for distinguishing the two species.—(D.H.K.)

66, DURHAM, 67-68, NORTHUMBERLAND & 70, CUMBERLAND. Swan, G. A. & Swan, M., 1967, Records: Flowering Plants and Ferns, *Vasculum*, **52,** 16, 22-24.

67, NORTHUMBERLAND, S. Taylor, N., 1967, Plant notes from Ryton, *Vasculum*, **52,** 14. Interesting plants recorded from Ryton include *Allium paradoxum*, *Arum maculatum* and *Hydrocharis morsus-ranae*.—[D.H.K.]

68, CHEVIOTLAND. Hird, L. P., 1967, Some plants along the Northumberland border, *Vasculum*, **52,** 15. Interesting species noted near Coldstream, on the English side of the border, were *Pyrola minor*, *Listera ovata*, *Orchis mascula* and *Ranunculus trichophyllus*.—[D.H.K.]

68, CHEVIOTLAND. Todd, A., 1967, Botanising on Holy Island, *Vasculum*, **52,** 21. Notes on some of the more uncommon species seen during a visit to Holy Island.—[D.H.K.]

SCOTLAND. Pears, N. V., 1967, Present tree-lines of the Cairngorm mountains, Scotland, *J. Ecol.*, **55,** 815-830.

75, AYR. McAllister, H. A., 1967, Minuartia verna in Ayrshire, *Glasg. Nat.*, **18,** 520.

75, AYR. Swarbrick, J. T., 1967, Plant distribution in a lowland agricultural area, *Trans. Proc. bot. Soc. Edinb.*, **40,** 308-330. Phytosociological studies on a lowland area in Ayrshire.—[D.H.K.]

76, RENFREW. Chisholm, A. D., 1967, Astrantia major in a new locality, *Glasg. Nat.*, **18,** 522.

76, Renfrew. Lennie, J. M., 1967, Sanguisorba canadensis at Castle Semple Loch, *Glasg. Nat.*, **18**, 522.

76, Renfrew. Morton, J. D., 1967, Star-of-Bethlehem (Ornithogalum umbellatum) in Renfrewshire, *Glasg. Nat.*, **18**, 523.

76, Renfrew. Rieley, J. O. & Bellamy, D. J., 1967, Barmufflock Dam Mire. History and present vegetation, *Glasg. Nat.*, **18**, 505-515. An historical and ecological account of the Barmufflock Dam Mire system near Bridge of Weir, in the parish of Kilbarchan. At least eleven ecologically distinct vegetational types were detected. The importance of the area as one having particularly interesting plant communities for teaching purposes in an area rapidly becoming built up is emphasized.—[D.H.K.]

77, Lanark. Mackechnie, R., 1967, Adder's Tongue (Ophioglossum vulgatum) in Lanarkshire, *Glasg. Nat.*, **18**, 520.

77, Lanark. Mackechnie, R., 1967, Vicia orobus near Falls of Clyde, *Glasg. Nat.*, **18**, 521. Records the welcome rediscovery of a single plant of *Vicia orobus* near Falls of Clyde in 1965. The species was first noted in the district over 150 years ago, but had apparently not been seen for many years.—[D.H.K.]

77, Lanark & 85, Fife. Corner, R. W. M., 1967, Lycopodium species on colliery debris in southern Scotland, *Trans. Proc. bot. Soc. Edinb.*, **40**, 337-338. Although species of the Lycopodiaceae are rare in southern Scotland, a number were found on old well-vegetated bings (pit heaps) in the Lanarkshire and Fife coalfields during 1966 and 1967. Out of a total of *c.* 70 bings examined *Lycopodium clavatum* was found on eight, and *Huperzia selago* (*Lycopodium selago*) and *Lycopodiella inundata* (*Lycopodium inundatum*) were found on two. Notes are provided on the habitats and associated species growing with these uncommon plants.—[D.H.K.]

80, Roxburgh. Corner, R. W. M., 1967, Calamagrostis scotica in Southern Scotland (v.c. 80), *Trans. Proc. bot. Soc. Edinb.*, **40**, 336-337. *Calamagrostis scotica*, previously thought to be confined in Scotland to Caithness, was discovered in 1965 growing abundantly in a wet depression beside a stream in the parish of Roberton. A list of associated species is provided.—[D.H.K.]

81, Berwick. Long, A. G. (Compiler), 1966-67, Botany, History, *Berwick Nat. Club*, **37**, 62-64 & 150. Notes on some of the more interesting plants found in Berwickshire in 1965 and 1966.—[D.H.K.]

82, Haddington, 83, Edinburgh, 84, Linlithgow & 85, Fife. Beattie, E. P., 1967, A contribution to the flora of the islands of the Firth of Forth, *Trans. Proc. bot. Soc. Edinb.*, **40**, 251-267. A description is given of the principal vegetation units of ten of the small islands in the Firth of Forth, and a systematic list of all the species noted is provided with details of the islands on which they occur.—[D.H.K.]

86, Stirling. Mackechnie, R., 1967, A Russian Lady's Mantle at Campsie, *Glasg. Nat.*, **18**, 521. Reports the discovery of *Alchemilla tytthantha* growing in quantity on a railway embankment near Campsie in 1965.—[D.H.K.]

86, Stirling. Mitchell, J. & Idle, E. T., 1967, Re-discoveries on Ben Lomond, *Glasg. Nat.*, **18**, 524. Rare species rediscovered on Ben Lomond in 1966 included *Potentilla crantzii*, *Minuartia verna*, *Polystichum lonchitis* and *Salix lapponum*. —[D.H.K.]

87, W. Perth. Mitchell, J., 1967, Veronica fruticans in West Perth, *Glasg. Nat.*, **18**, 523. The discovery of *Veronica fruticans* on a small exposure of 'sugar' or metamorphic limestone on Beinn Dubhcraig in 1966 confirms F. Buchan White's record—'rocks above Loch Oss' (*Flora of Perthshire*, p. 231 (1898)), subsequently reported by J. R. Lee (as *V. saxatilis*) (*Flora of the Clyde Area*, p. 242 (1933)). —[D.H.K.]

96, Easterness. Roger, J. Grant, 1967, Carex rupestris All. in Glenfeshie Forest, Inverness-shire (v.c. 96, Easterness), *Trans. Proc. bot. Soc. Edinb.*, **40**, 337. *Carex rupestris* was discovered in July 1966 growing on calcareous schist in Coire Ghorbhlach, Glenfeshie Forest, within the Cairngorms National Nature Reserve. A list of associated species is given.—[D.H.K.]

97, Westerness. McBeath, R., 1967, Phyllodoce caerulea (L.) Bab. on Ben Alder (v.c. 97), *Trans. Proc. bot. Soc. Edinb.*, **40**, 335-336. A single plant of *Phyllodoce caerulea* was discovered in 1966 on Ben Alder, at *c.* 2,200 ft. on acid soil among *Calluna vulgaris*, *Erica tetralix* and *E. cinerea*. The species was previously thought to be restricted to the Sow of Atholl, Perthshire, in Scotland.—[D.H.K.]

98, Argyll. Kenneth, A. G., 1967, Noteworthy plants at Taynuilt, Argyll, *Glasg. Nat.*, **18**, 523-524. Uncommon plants noted at Taynuilt in 1966 included *Mycelis muralis*, *Pimpinella saxifraga*, *Leontodon hispidus* and putative *Festuca arundinacea* × *gigantea*.—[D.H.K.]

98, Argyll. McAllister, H., 1967, Dryopteris assimilis on Beinn Narnain, *Glasg. Nat.*, **18**, 519.

98, Argyll. Stirling, A. McG., 1967, Arctous alpinus in Argyll, *Glasg. Nat.*, **18**, 523. Records the discovery of *Arctous alpinus* on Meall a'Bhuiridh, Glencoe, altitude 1,800 ft. in 1966. This is not only the first record for Argyll but also the most southerly station for the species so far recorded in Britain.—[D.H.K.]

99, Dunbarton. Mill, R. R., 1967, *Flora of Helensburgh*. Pp. 32. Helensburgh. Price 6/-. A systematic list arranged in Bentham and Hooker order with details of localities and frequencies of Helensburgh plants. Two sections deal with vascular plants, the first with native and established species, the second with alien species and garden escapes. Details of Bryophyta and fungi are also included. The work appears to contain a number of doubtful records.—[D.H.K.]

101, Kintyre. Kenneth, A. G., 1967, Plants of Cara, Kintyre, *Glasg. Nat.*, **18**, 524. Notes on uncommon plants noted on the Isle of Cara during June 1966.—[D.H.K.]

105, W. Ross. Bunce, R. G. H. & Myerscough, P. J., 1967, Saxifraga rivularis on Beinn Eighe, *Trans. Proc. bot. Soc. Edinb.*, **40**, 321-324. A new locality is described from Beinn Eighe, Wester Ross. Species lists from the site and from two nearby sites are compared in relation to soil analyses.—[Author's summary]

108, W. Sutherland. Anthony, J., 1967, Sagina saginoides (L.) Karst. in West Sutherland (v.c. 108), *Trans. Proc. bot. Soc. Edinb.*, **40**, 335. *Sagina saginoides* usually a montane species in Scotland is reported from sea cliffs at Stoer. The plant, which was first noted in 1959, grows at a low elevation (*c.* 30-80 ft.) on bare cliff ledges.—[D.H.K.]

108, W. Sutherland. Braid, K. W., 1967, Bracken (Pteridium aquilinum) sporeling regeneration in West Sutherland, *Glasg. Nat.*, **18**, 518.

111, Orkney. Bullard, E. R., 1967, Primula scotica Hook., *Bull. Orkney Fld Club*, **4**, 4-5. Studies on *Primula scotica* in the Orkneys.—[D.H.K.]

111, Orkney. Bullard, E. R., 1967, Puccinellia capillaris (Liljebl.) Jansen, *Bull. Orkney Fld Club*, **4**, 5. Notes on the occurrence of *Puccinellia capillaris* in the Orkneys.—[D.H.K.]

111, Orkney. Bullard E. R., 1967-68, Orkney: check-list of vascular plants. Part 1, December 1967, *Bull. Orkney Fld Club*, **4**, 7-8. The commencement of a check-list of vascular plants recorded from the Orkneys, including data based on specimens in the late Col. H. Halcro Johnston's herbarium at Edinburgh and in Magnus Spence's herbarium at Stromness, Orkney. Genera from Lycopodiaceae to Cruciferae (*Barbarea*) are treated, and notes on the status and frequency of the various species are provided. Part 2, March 1968, *Bull. Orkney Fld Club*, **5**, [Pp. 2]. Covers genera from Cruciferae (*Arabis*) to Geraniaceae (*Erodium*).—[D.H.K.]

H.2, N. KERRY. O'Sullivan, A. M., 1967, *Reconnaissance Botanical Survey of the Bourne Vincent Memorial Park, Killarney, Co. Kerry (August* 5-12 1966). An Foras Talutais. Irish Vegetation Studies No. 1. Pp. 13. A phytosociological account of the Bourne Vincent Memorial Park.—[D.H.K.]

H.8, LIMERICK. O'Sullivan, A. M., 1967, Gaudinia fragilis (L.) P. Beauv. in Limerick grassland, *Ir. Nat. J.*, **15,** 343-345.

H.12, WEXFORD. McMillan, N. F., 1968, Allium triquetrum L. and Oxalis articulata Savigny in Co. Wexford, *Ir. Nat. J.*, **16,** 26.

H.16, GALWAY. Rose, F., 1967, Eriophorum gracile Roth new to Ireland, *Ir. Nat. J.*, **15,** 361-362.

H.20, WICKLOW. Craig, A. J., 1968, Ornithopus perpusillus L. in Co. Wicklow, H.20, *Ir. Nat. J.*, **16,** 26.

H.20, WICKLOW. Goodwillie, R. N., 1968, Spergularia rubra in Co. Wicklow, *Ir. Nat. J.*, **16,** 26.

H.22, MEATH & H.31, LOUTH. Synnott, D. M., 1968, Melilotus spp. and Eriophorum latifolium in Co. Louth and Co. Meath, *Ir. Nat. J.*, **16,** 27.

H.31, LOUTH. Synnott, D. M., 1968, Sambucus ebulus L. in Co. Louth, *Ir. Nat. J.*, **16,** 27. *Sambucus ebulus* is reported as new to Co. Louth.—[D.H.K.]

H.40, DERRY. Clarke, R. S., 1968, Status of Epipactis palustris at Magilligan, Co. Londonderry, *Ir. Nat. J.*, **16,** 26. *Epipactis palustris* had not been seen in the Magilligan area since the site at Umbra was ploughed some five or six years ago. Three members of the Route Naturalists' Field Club visited the site in July 1967 without success, but on extending the search to the area between Magilligan station and the sea they were rewarded by finding large stands of the species over an area of about a quarter of a mile. Another colony was also located in a valley further west. Details of some associated species are given.—[D.H.K.]

H.40, DERRY. *Route Naturalists' Field Club*, 1967, *A Preliminary Survey of the Magilligan Area*. Price 5/-. Contains a list of the flowering plants, excluding Cyperaceae and the Gramineae, found in the area, together with details of occurrence and frequency.—[D.H.K.]

FLORAS, CATALOGUES, ETC.

EUROPE

Barneby, T. P., 1967, *European Alpine Flowers in Colour*. Pp. 239. Thos. Nelson. London. Price 70/-. Coloured photographs of 576 European alpine species with accompanying text, and vernacular names in English, French and German.—[D.H.K.]

Ehrendorfer, F., 1967, *Liste der Gefässpflanzen Mitteleuropas*. Pp. iii + 253. Graz. An alphabetically arranged check list of the vascular plants of Mid-Europe, with synonyms, etc. The countries embraced by the work are Austria, Czechoslovakia, Germany, Switzerland, part of Italy, and Jugoslavia. The countries in which the various species occur are indicated by letters.—[D.H.K.]

BELGIUM de Langhe, J.-E., Delvosalle, L., Duvigneaud, J., Lambinon, J., Lawalrée, A., Mullenders, W. & Berghen, C. Van den (Editors), 1967, *Flore de la Belgique, du Nord de la France et des Régions voisines . . . redigée a l'initiative de William Mullenders*. Pp. xliv + 749. Liege. An entirely new flora covering Belgium and northern France, with brief descriptions of species and keys to their identification. —[D.H.K.]

British Isles Clapham, A. R., Tutin, T. G. & Warburg, E. F., 1968, *Excursion Flora of the British Isles*. Edition 2. Pp. xxxv + 586. Cambridge University Press. Price 30/-. A new edition of the *Excursion Flora of the British Isles*, which is essentially a shortened version of the same authors' *Flora of the British Isles*, the last edition of which was published in 1962.—[D.H.K.]

Bulgaria Stojanov, N. & Kitanov, B., 1966, *Visokoplaninskite Rastenija v Balgarija*. (*Hochgebirgs-pflanzen Bulgariens*). Pp. 150 + 70 plates. Nauki i Izkustvo, Sofia.

France Breistroffer, M., 1966, Flore abrégée du Diois (Drôme), *Bull. Soc. bot. Fr.*, **110** (Session Extraord.), 42-143.

de Langhe, J.-E., Delvosalle, L., Duvigneaud, J., Lambinon, J., Lawalrée, A., Mullenders, W. & Berghen, C. Van den (Editors), 1967, *Flore de la Belgique, du Nord de la France et des Régions voisines . . . redigée a l'initiative de William Mullenders*. Pp. xliv + 749. Liege.

Germany Dörn, E., 1966, Flora des Allgäus, 2. Teil: Papilionaceae, *Ber. bayer. bot. Ges.*, **39**, 35-55.

Greece Greuter, W. & Rechinger, K. H., 1967, Flora der Insel Kythera gleichzeitung Beginn einer nomenklatorischen Überprüfung der greichischen Gefässpflanzenarten, *Boissiera*, **13**, 11-200. An account of the flora of the Greek island of Kythera, with descriptions of species and keys to their identification. —[D.H.K.]

Ireland Webb, D. A., 1967, *An Irish Flora:* with drawings by Hilda Parkes, B.A. and Pearl Boatman, Ph.D. Fifth revised edition. Pp. xxxii + [12 pp. of drawings] + 259. Dundalk.

Italy Zodda, G., 1967, Compendio della Flora Teramana, *Archivio Bot.*, **43**, 35-101, 117-156. A concise summary of the flora of the Italian province of Teramo, based on previous publications and personal observation.—[D.H.K.]

Portugal Vidal, W. N. & Vidal, M. R. R., 1966, Illustrated catalog of the flora of Vicosa (Por.), *Experienticae*, **6**, 145-226. A list of the vascular plants of Vicosa, with keys to the identification of genera and species.—[D.H.K.]

Romania Beldie, A., 1967, *Flore si Vegetatia Muntilor Bucegi. Academiei Republicii Socialiste România*. Pp. 578 + 1 map. Bucharest. Price Lei 32. An account of the flora and phytogeography of the Bucegi Mountains, East Carpathians.—[D.H.K.]

Beldie, A., 1967, Endemismele si elementele dacice din flora Carpatilor Romaniei, *Comm. Bot.*, **59**, 113-130. An inventory of the endemic taxa of the Romanian Carpathians is given, with floristic notes, etc.—[D.H.K.]

Prodan, I. & Buia, A., 1966, *Flora mica ilustrata a Romaniei*. Pp. 677, with 699 text figures. Agro-Silvatica Bucuresti. Price Lei 31. A concise illustrated flora of Romania, with abbreviated descriptions and keys to the identification of genera and species.—[D.H.K.]

Russia Eichwald, K., 1966, *Eesti NSV Floora*, **10**. Pp. 298. Eesti NSV Teaduste Akadeemia Zoologia ja Botaanika Instituut, Tallinn. The tenth part of a flora of the province of Estonia, covering Cyperaceae.—[D.H.K.]

Pavlov, N. V. (Editor), 1966, *Flora Kazakhstana*, **9**. Pp. xx + 640. Akad. Nauk. Kazakhsk. SSR.

Spain Malagarriga, Bro. T., 1965, *Flora analitica de Barcelona*, 1. *Fanerogamas*. Pp. 271, with many text figures. La Salle Bonanova, Barcelona. Price 26 Sh. The first part of a new flora of Barcelona, with descriptions of species and keys to their identification.—[D.H.K.]

SWITZERLAND Hess, H. E., Landolt, E. & Hirzel, R. (Editors), 1967, *Flora der Schweiz und angrenzender Gebiete*, vol. 1. Pteridophyta bis Caryophyllaceae. Pp. 858. Birkhäuser Verlag, Basel und Stuttgart. Price S. Fr. 118. The first volume of a new and very comprehensive flora of Switzerland, with introductory chapters on geology, phytogeography, phytosociology, etc. The main text covers families, etc. from the Pteridophyta to Caryophyllaceae, with detailed descriptions of species, synonymy, keys to the identification of genera and species, etc.—[D.H.K.]

Merz, W., 1966, Flora des Kantons Zug, *Mitt. naturf. Ges. Luzern*, **20**, 5-347. A systematic account of the flora of the Canton of Zug.—[D.H.K.]

TURKEY Davis, P. H. (Editor), 1967, *Flora of Turkey and the East Aegean Islands*. Vol. 2. Pp. xi + 581. University Press, Edinburgh. Price £9.9.0. The second volume of the Flora of Turkey covers families from Portulacaceae to Celastraceae. —[D.H.K.]

AFRICA

Batten, A. & Bokelmann, H., 1966, *Wild Flowers of the Eastern Cape Province*. Pp. 185 + 127 coloured plates. Books of Africa (Pty.) Ltd., Cape Town. Descriptions and excellent coloured illustrations are provided for 758 species belonging to 114 families, which virtually forms a cross section of the Eastern Cape flora. —[D.H.K.]

Maire, R., 1967, *Flore de l'Afrique du Nord*. Vol. 13. Encyclopédie Biologique 68. Pp. 365. Paul Lechevalier, Paris. Price NFr. 75. Volume 13 of the Flora of North Africa, covering a number of genera in the Cruciferae.—[D.H.K.]

Mouterde, P., 1966, *Nouvelle Flore du Liban et de la Syrie*. Vol. 1. Atlas 186 plates. Text pp. 567. Editions de l'Imprimerie Catholique, Beyrouth. The first volume of this new flora of the Lebanon and Syria covers the Pteridophyta, Gymnospermae, Monocotyledons, and Dicotyledons from Salicaceae to Caryophyllaceae.—[D.H.K.]

NORTH AMERICA

CANADA Boivin, B., 1966-67, Enumeration des plantes du Canada, *Naturaliste can.*, **93**, 989-1063: **94**, 131-157, 471-528, 625-655. The completion of an excellent check-list to the species, subspecies, varieties, forms and hybrids of vascular plants known to occur in Canada, with numerous references to monographs and taxonomic papers relating to the various genera. A summary shows that the Canadian flora consists of 3,060 native and 936 introduced species, with an additional 1,453 subspecies, varieties, forms and hybrids. In the final part of the work details are provided of species apparently absent from Canada but known to be present in the adjacent territories of Greenland, Alaska and St. Pierre-et-Miquelen.—[D.H.K.]

GREENLAND Böcher, T. W., Holmen, K. & Jakobsen, K., 1968, *The Flora of Greenland*, illustrated by I. Frederiksen. English translation by T. T. Elkington and M. C. Lewis. Pp. 312. Copenhagen. Price £5. An English translation of the 1966 2nd Danish edition of the Flora of Greenland with some small revisions. —[D.H.K.]

AUSTRALASIA

TASMANIA Curtis, W. M., 1967, *The Student's Flora of Tasmania*. Part 3. Angiospermae: Plumbaginaceae to Salicaceae. Pp. 465-661. Tasmania.

ECOLOGICAL (See also TOPOGRAPHICAL)

Anderson, D. J., 1967, Studies on structure in plant communities, 3. Data on pattern in colonizing species, *J. Ecol.*, **55**, 397-404.

Borg, P., 1967, Ecological notes on Fucus wracks near Helsinki, *Mem. Soc. Fauna Flora fenn.*, **43**, 20-36. The origin, physical and chemical composition of the *Fucus* wracks (seaweed beds) on the outer islands off Helsinki are reviewed, and the various vascular plants which have colonised them are discussed.—[D.H.K.]

Brunerye, L., 1966, Evolution floristique de quelques mares artificielles de Corrèze, *Cah. Nat.*, **22**, 57-69. The flora of artificially made ponds, studied in 1961, is compared with the flora observed five years later and the developments discussed. —[E.B.B.]

Dobben, W. H. **Van**, 1968, Symposium on 'The Mechanism of Ecological Adaption' held October 28 1967: Morphological and physiological adaptions to external conditions, *Acta bot. neerl.*, **17**, 80-81.

Galoux, A., 1967, Les territoires écologiques. Analyse—Description—Classification, *Lejeunia*, **41**, 1-20. The analysis, description and classification of ecological elements and factors in dry-land areas are discussed and illustrated.—[D.H.K.]

Haikari, O. & **Paarlahti**, K., 1967, Results of field experiments on the ecology of pine, spruce and birch, *Metsantutk. Julk.*, **64** (1), 1-135. Studies on the ecology of various species of *Pinus*, *Abies* and *Betula* in Finland.—[D.H.K.]

Harper, J. L., 1967, A Darwinian approach to plant ecology, *J. Ecol.*, **55**, 247-270.

Heydecker, W., 1967, Drought hazards to seed germination, *Ann. Arid Zone*, **6**, 22-34.

Hutchinson, T. C., 1967, Comparative studies of the ability of plant species to withstand prolonged periods of darkness, *J. Ecol.*, **55**, 291-299. The comparative ability of woodland species and those of unshaded habitats to withstand prolonged periods of darkness has been investigated. Species of woodlands were found to survive longer than species of unshaded habitats. Several species were able to survive for a very long period of darkness and to resume vigorous growth upon the resumption of suitable light conditions. Survival of up to 104 days in the dark at 15°C. was recorded. Survival in the dark was longest on chronically toxic or nutritionally poor soils. This survival was temperature dependent. Seed weight had a direct bearing on seedling survival within the habitat categories but not between them. Freshly germinated seedlings survived longer in the dark than seedlings raised for a period in light prior to being transferred to the dark. Death was frequently associated with fungal attack.—[D.H.K.]

Ingram, H. A. P., 1967, Problems of hydrology and plant distribution in mires, *J. Ecol.*, **55**, 711-724.

Ivimey-Cook, R. B. & **Proctor**, M. C. F., 1967, Factor analysis of data from an East Devon heath: a comparison of principal component and rotated solutions, *J. Ecol.*, **55**, 405-413. Floristic lists from ninety-four quadrants are presented in the form of a multiple contingency table. In a principal component analysis of the correlation matrix calculated between rows (or columns) of this table the first three components reflect respectively abundance (or ecological amplitude), soil moisture and base status; the fourth and fifth components cannot be simply interpreted. A rotated solution for five factors using Kaiser's varimax criterion gives five axes readily interpretable in ecological terms, corresponding to five recognizable vegetation types. The rotated solution appears to be more informative of floristic relationships within the data than the principal component solution.—[Authors' summary]

Iwata, E. & Shizuka, K., 1967, Plant succession in Hachirogata Polder: Ecological studies on Common Reed (Phragmites communis), 1, *Ecol. Rev.* (*Japan*), **17,** 37-46. Studies on the succession of plant communities on reclaimed land bordering Hachirogata Lagoon, the second largest lake in Japan, Akita Prefecture, N.E. Honshu, between 1964 and 1966. Within a few months of reclamation annual weeds, e.g. *Ranunculus sceleratus*, *Chenopodium glaucum* and *Eleocharis acicularis* were the first to appear, these were subsequently replaced by other annual weeds, e.g. *Polygonum lapathifolium*, *Echinochloa crus-gallii*, etc., in the drier areas. By the second year *Phragmites australis* (*P. communis*) had become conspicuous, and within three to four years had become dominant in the area.—[D.H.K.]

Kershaw, K. A., 1967, Ecological methods and computers, *Sci. Progr.*, **55,** 437-451. The application of multivariate techniques to ecological problems has increased rapidly over the last few years largely as a result of the availability of digital computers.

The analysis of pattern in vegetation is described and the objective assessment of plant associations using Chi-square as a measure of interspecific association is outlined in relation to the comparative problem of ordination or classification. Principal component analysis as an ordination approach offers considerable promise for future studies and an example of its use, based on European heath communities is given.—[Author's summary]

Klötzli, F., 1967, Umwardlung von Moor und Sumpfgesellschaften durch Abwässer im Gebiet des Neeracher Riets, *Ber. Geobot. Inst. Eidg. Techn. Hochschule Stif. Rübel* (*Zürich*), **37,** 104-112. Studies on the influence of waste waters on the plant associations of the 'Neeracher Riet', the largest swamp in northern Switzerland. Luxuriant stands of *Phragmites australis* (*P. communis*) and *Phalaris arundinacea* develop in waters rich in nitrate of ammonia, while *Lemna minor* spreads chiefly under the influence of waters with a high phosphate content.—[D.H.K.]

Knight, G. H., 1967, Exercises on ecology, *Rep. Warwick nat. Hist. Soc.*, **13,** 10-15. Ecological Studies on the effects of drought on *Mercurialis perennis*, on the dioecious difficulties in *Silene dioica*, and on the seed dispersal of *Primula vulgaris*, together with notes on the effects of mollusc damage to flowers and capsules of the latter.—[D.H.K.]

Koller, B., 1967, The control of seed germination by water relations, *Ann. Arid Zone*, **6,** 35-41.

Kuhn, E., 1967, Weeds as plant indicators of soil types, *Czech. Min. Zemedel. Les. Hospodar. Ustav.*, **40,** 333-360.

Lambert, J. M. (Editor), 1967, *The Teaching of Ecology. British Ecological Society Symposium number seven.* Pp. viii + 294. Blackwell Scientific Publications. Oxford and Edinburgh. Price 47/6. An account of the seventh symposium held by the British Ecological Society at Goldsmith's Hall, University of London, between April 13 and 16 1966, with full reports of the various papers read.—[D.H.K.]

Landolt, E., 1967, Gebirgs und Tieflandsippen von Blütenpflanzen im Bereich der Schweizer Alpen, *Bot. Jb.*, **86,** 463-480. Studies on mountain ecotypes and their corresponding lowland ecotypes growing on similar soils under similar light conditions in Switzerland.

The mountain ecotypes may usually be distinguished from their lowland counterparts by their prostrate growth, shorter and broader leaves, which are often less divided and less pilose, by their large flowers, or flower heads, bigger seeds, and longevity: annuals and biennials are very rare. These morphological characters represent a selection advantage in the mountain ecotypes.

Lowland ecotypes, with their main distributions in the Mediterranean region, in northern or eastern Europe or in western Asia, are found only in warm localities in Switzerland. They are assumed to be more primitive and as a consequence have been able to produce montane ecotypes. Many of the lowland ecotypes which are widespread in Switzerland are, however, of later origin, as at least 40 out of 100 are polyploids. It is suggested that many of them originated from hybridisation between lowland ecotypes distributed in warmer regions and mountain ecotypes. The influence of man (e.g. clearing of woodlands, etc.) facilitated the contact between the corresponding ecotypes and partially destroyed the original limits between the two.—[D.H.K.]

Livingston, R. B. & Allessio, M. L., 1968, Buried viable seed in successional field and forest stands, Harvard Forest, Massachusetts, *Bull. Torrey bot. Club*, **95,** 58-69. Disruption of any plant community is usually followed by the appearance of earlier successional species which have been buried as viable seed. Experimental studies corroborating this were carried out by collecting soil samples from sixteen sites in Harvard Forest, studying existing ground cover and listing the species present.—[D.H.K.]

Owens, M., Learner, M. A. & Morris, P. I., 1967, Determination of the biomass of aquatic plants using an optical method, *J. Ecol.*, **55,** 671-676.

Pears, N. V., 1967, Wind as a factor in mountain ecology: some data from the Cairngorm Mountains, *Scott. geogr. Mag.*, **83,** 118-124.

Provost, M., 1966, Contribution à l'étude du repeuplement végétal de surfaces de tourbe récemment décapées, *C. r. somm. séanc. Soc. Biogéogr.*, **43,** 18-32. An account of the stages over ten years of the re-populating of drained bogs in the province of La Manche.—[E.B.B.]

Richardson, J. A. & Greenwood, E. F., 1967, Soil moisture tension in relation to plant colonization of pit heaps, *Proc. Univ. Newcastle upon Tyne Phil. Soc.*, **1,** 129-136. Experimental studies on Durham pit heaps with the use of simple measuring apparatus supports the view that soil moisture tension is an important factor in controlling the establishment of plants on pit heaps. Correlations are shown between the moisture tension of soil and the location of vegetation on different pit heaps, and it is emphasized that a study of the moisture content of soils on ground of different aspect and slope is essential to the study of natural colonization and artificial planting on such heaps.—[D.H.K.]

Runge, F., 1967, Die Armächtigkeitsschankungen in einem nordwestdeutschen Enzian-Zwenkenrasen, 2, *Vegetatio*, **15,** 124-128. An ecological study in a *Gentiana-Koelerietum* stand in the Beckumer mountains of Westphalia carried out from 1957-61 and 1962-66. A quadrat was marked out in the area and fluctuations in frequency of various species were noted. Most perennial species showed little fluctuation, though some continually decreased or increased in quantity. *Brachypodium pinnatum* showed a continuous decrease from 1957 to 1966, probably as a result of the increase in the rabbit population of the area following the myxomatosis epidemic of 1956. Other species, especially certain annuals were noted to fluctuate in abundance largely as a result of climatic factors, e.g. *Gentianella germanica* and *Linum catharticum* decreased greatly after dry periods during the spring or summer, but increased again after wet summers.—[D.H.K.]

Ryberg, M., 1967, Några snypunkler på lundgräsens ekologi i östra Svealand, *Svensk bot. Tidskr.*, **61,** 385-418. Ecological studies of woodlands in eastern central Sweden with particular emphasis on the Gramineae.—[D.H.K.]

Sayers, R. L. & Ward, R. T., 1966, Germination responses in alpine species, *Bot. Gaz.*, **127,** 11-16. Details are provided of germination studies under controlled conditions of various types, of six species of alpine plants from the United States. These include *Deschampsia cespitosa* and *Luzula spicata.* Reasonably good germination was obtained from all species except *Luzula spicata*. Factors considered were alternating temperatures, moisture stress, subfreezing temperature, availability of light, etc.—[D.H.K.]

Spedding, C. R. W., 1967, Grassland ecology, *Ann. Rep. Grassland Research Stat.* (*Hurley*), **1966**, 60-62.

Tanghe, M., 1967, Les groupes écologiques forestiers de la Gaume, *Lejeunia*, **43**, 1-64. In this study of forest areas in the Jurassic district of Belgium, several transects are discussed and illustrated and the autecology of species commented upon.—[E.B.B.]

Tyler, G., 1967, On the effect of phosphorus and nitrogen, supplied to Baltic shore-meadow vegetation, *Bot. Notiser*, **120**, 433-447.

Van der Maarel, E. & Leertouwer, J., 1967, Variation in vegetation and species diversity along a local environmental gradient, *Acta bot. neerl.*, **16**, 211-221.

Zak, J. M. & Bredakis, E. J., 1967, Establishment and management of roadside vegetative cover in Massachusetts, *Mass. Agric. Exp. Stat. Bull.*, **562.** Pp. 20. Studies on various phases of establishing and managing roadside vegetation in Massachusetts. Among the grass seed sown on verges *Festuca rubra* and *F. arundinacea* are dominant and in places suppress the establishment of *Poa pratensis*. Notes are provided on the survival rate of various planted trees and shrubs.—[D.H.K.]

Ziemankowski, V. L. & Serbanescu, G. H., 1967, Flora spontana si problema î hiebarii rambleelor din lunca inundabila si Delta Dunarii, *Comm. Bot.*, **5**, 51-58. Notes on a number of species, including *Agropyron repens*, *Cynodon dactylon*, *Agrostis stolonifera*, *Trifolium repens*, *T. fragiferum*, *Melilotus alba* and *M. officinalis*, sown on dams and platforms built in the Danube delta to ensure protection against erosion and flooding.—[D.H.K.]

PHYTOSOCIOLOGICAL, PHYTOGEOGRAPHICAL AND FLORISTIC STUDIES

Aletsee, L., 1967, Begriffliche und floristische Grundlagen zu einer pflanzengeographischen Analyse der europäischen Regenwassermoorstandorte (Mit einer Diskussion der floristischen Gradienten innerhalb der europäischen Hochmoorvegetation), *Beitr. Biol. Pfl.*, **43**, 117-283.

d'Ansembourg, V. de, Zuttere, P. le, Louette, A., Matagne, G. & Parent, G. H., 1967, Quelques plantes vasculaires intéressantes de l'Ardenne méridionale et du district Jurassique, *Lejeunia*, *nouv. sér.*, **44**, 1-47. An annotated list, with notes and comments, of some of the more interesting species found in the Ardennes. In particular recent arrivals are noted and some extinctions referred to.—[E.B.B.]

Augier, H. & Boudouesque, C.-F., 1967, Végétation marine de l'île de Port-Cros (Parc national), 1. La baie de La Pallu, *Bull. Mus. Hist. nat. Marseille*, **27**, 93-124.

Barbaro, M., 1967, L'Isoetion des Maures groupements mésophiles—Etude du milieu, *Annls. Fac. Sci. Marseille*, *Biol. Vég.*, **39**, 25-37.

Barbaro, M. & Loisel, R., 1967, Nouvelles additions à la flore du département du Var, *Annls. Fac. Sci. Marseille*, *Biol. Vég.*, **39**, 39-44. An extensive list of additions is given for the flora of the département of Var.—[D.H.K.]

Bastin, B., 1967, Pflanzengeographische Probleme der offenen Vegetation Europas während der letzten Eiszeit, *Ber. dt. bot. Ges.*, **80**, 697-704.

Beug, H.-J., 1967, Probleme der Vegetationsgeschichte in Südeuropa, *Ber. dt. bot Ges.*, **80**, 682-689.

Bidault, M. & Bugnon, F., 1967, Remarques sur la végétation des reservoirs asséchés du Canal de Bourgogne, *Rev. Fed. Franc. Soc-Sci. Nat.*, **6**, 11-13. The most interesting species occurring after the drying out of reservoirs along the Canal are listed and several observations made on physiological aberrations with reference to the latter, illustrations are provided for *Bidens tripartita* and *Chenopodium rubrum.*—[D.H.K.]

Borhidi, A., 1967, A Meseki flórajárás (Sopianicum) Flórájához, 1. *Bot. Közl.*, **54**, 149-164. Notes on the flora of the district of Sopianicum, southern Hungary, including descriptions of a number of new forms and varieties. Many of the species treated occur also in Britain.—[D.H.K.]

Bournerias, M., 1967, Troisième contribution au Catalogue de la Flore de l'Aisne (Additions, corrections, remarques écologiques), *Rev. Fed. Franc. Soc. Sci. Nat.*, **6**, 375-382. Four pteridophytes and several flowering plants are listed in this third contribution to the 'Flore de l'Aisne'. New localities and species new to the area are indicated as well as the existence of herbarium specimens.—[E.B.B.]

Braun-Blanquet, J., 1967, Une associato borés-arctique nouvelle pour les alpes-françaises le Kobresietum simpliuscalae, *Contr. Bot.* ('*Univ. Babes Bolyai*'): *Omagio octogenarului professor Dr. docent Alexandra Borza*, 47-52.

Bresinsky, A., 1965, Zur Kenntnis des Circumalpinen Florenelements im Varland nordlich der Alpen, *Ber. bayer. bot. Ges.*, **38**, 5-67.

Bujoreanu, G. & Grigore, S., 1967, Contributii la studiul associatiilor de buruieni din Binat, *Contr. Bot.* ('*Univ. Babes Bolyai*'): *Omagio octogenarului professor Dr. docent Alexandra Borza*, 53-75. Phytosociological studies on six ruderal associations in the plain of Burat, Romania.—[D.H.K.]

Comps, B., 1967, Observations phytogéographiques et floristiques dans le vallée du Tech (Pyrenées-Orientales), *Le Botaniste*, **50**, 89-97. The valley of the Tech presents a remarkable example of altitudinal zonation of vegetation, which is discussed with detailed notes on particular species.—[D.H.K.]

Cristofolini, G., Lausi, D., Tarabocchia, M. & Pignatti, S., 1967, Flora e vegetazione dell'isola di Pianosa (Isole Tremiti), *G. bot. Ital.*, **101**, 189-198. An account of the flora and vegetation of the isle of Pianosa (Isles Tremiti), Italy, which is mainly composed of Mediterranean species with a few Adriatic endemic species.—[D.H.K.]

Davidsson, I., 1967, The immigration and naturalization of flowering plants in Iceland since 1900, *Greinar*, **4** (3), 1-35. Since 1900 more adventive species have been introduced into Iceland than at any previous time, especially since the beginning of the Second World War. No less than 183 adventive species, of which 26 may be considered to be naturalised, are listed. The latter include *Alopecurus pratensis*, *Holcus lanatus*, *Achillea ptarmica*, *Lamium amplexicaule*, *L. purpureum*, *Anthriscus sylvestris*, *Aegopodium podagraria* and *Rorippa sylvestris.* Adventive species which have almost become naturalised include *Epilobium adenocaulon*, *Galium album* (*G. mollugo*) and *Cirsium heterophyllum.*

The introduction and historical spread of *Bromus inermis*, *Lamium album*, *Myosotis scorpioides*, *Aegopodium podagraria*, *Anthriscus sylvestris*, *Tussilago farfara* and *Matricaria matricarioides* are treated at length and illustrated by distribution maps.

Adventives occur almost entirely near towns, and often grow as common weeds, but remain rare in the uninhabited areas of the country.

The methods of introduction of foreign plants into Iceland are discussed and it is concluded that most are introduced with grass seed or chicken food.—[D.H.K.]

Debreczy, Z., 1967, Über die Eichen-Hainbuchenwälder des Balatonberlandes neben Balatonfüred und Csopak (Ungarisches Transdanubisches Mittelgebirge), *Ann. Mus. Hung.*, **59,** 175-189.

Desfayes, M., 1967, Flore aquatice: additions et corrections, *Bull. Murithienne*, **84,** 1-6. A list of interesting species observed in 1966 with some corrections to a previously published list, mostly from the Rhône valley.—[E.B.B.]

Dhien, R., 1967, Un peuplement initial de végétation, *Revue Fed. Franc. Soc. Sci. Nat.*, **6,** 3-8. A systematic list of the species colonising a railway disused for about the past twelve years in the Seine-et-Oise is given, with some indication of frequency. The phytogeographical element to which each species belongs is also noted.—[E.B.B.]

Dhien, R., 1967, Florule du Bois d'Evans (Jura), *Revue Fed. Franc. Soc. Sci. Nat.*, **6,** 77-80. Lists are provided of the species occurring in the tree-layer, thickets, stream, clearing and tracks in this small wood which is situated not far distant from three large forest areas.—[E.B.B.]

Dhien, R., 1967, La végétation des Stations thermales, 3. Maizières (Côte-d'Or), *Cah. Nat.*, **23,** 17-19. Lists are provided of the more interesting vascular plants noted in a number of habitats in the neighbourhood of the curative establishment. An analysis of the phytogeographical affinities of the species recorded is given in a table.—[E.B.B.]

Donita, N., 1968, Die Eichenwälder im Südosten Rümaniens und ihre Beziehungen zu den Eichen-Hainbuchen Waldern, *Feddes Rep.*, **77,** 177-188.

Ellenberg, H. & Klötzli, F., 1967, Vegetation und Bewirtschaftlung des Vogel reservates Neeracher Riet, *Ber. Geobot. Inst. Eidg. Techn. Hochschule Stift. Rübel* (*Zürich*), **37,** 88-103. The 'Neeracher Riet', the largest swamp in northern Switzerland was studied phytosociologically. Seventeen different vegetation units were distinguished on the basis of their floristic composition and ecology. These are described and discussed.—[D.H.K.]

Ellenberg, H. & Mueller-Dombois, D., 1967, A key to Raunkiaer plant life forms with revised subdivisions, *Ber. Geobot. Inst. Eidg. Techn. Hochschule Stift. Rübel* (*Zürich*), **37,** 56-73.

Faegri, K., 1967, *The Plant World of Finse, Norway*. Pp. 40. University Botanical Museum Bergen. Bergen. A tourist guide in English to the high mountain flora of Finse, W. Norway. The work covers ecological, geological and climatic factors, and recommends routes for a number of interesting excursions in the area. It concludes with a list of the species known to occur at Finse, with botanical and vernacular Norwegian and English names.—[D.H.K.]

Fekete, G., 1967, Der Walnuss-Baunhasel-Felsenwald der Berge von Ottenien, *Ann. Mus. Hung.*, **59,** 163-173.

Fridriksson, S. & Johnsen, B., 1967, The vascular flora of the outer Westman Islands, *Greinar*, **4** (3), 37-66. Studies on the flora of eleven of the Westman Islands off the southern coast of Iceland. Vegetational units are analysed and plant communities described.—[D.H.K.]

Frileux, P.-N., 1966, Quelques remarques sur la flore et la végétation calcicoles aux environs de Andelys (Eure), *Bull. Soc. Bot. N. Fr.*, **19,** 227-261.

Fukarek, F., Jeschke, L., Schneider, U. & Wegener, K. A., 1966, Verbreitungskarten zur Pflanzengeographie Mecklenburgs, 4 Reihe (Atlantische-subatlantische Elemente, 2 Teil.), *Natur. Natursch. Mecklenb.*, **4,** 201-252. Distribution maps are provided showing the European range of a number of Atlantic and subatlantic species.—[D.H.K.]

Fukarek, F., Kleinke, J., Schneider, U. & Wegener, K. A., 1967, Verbreitungskarten zur Pflanzengeographie Mecklenburgs, 5 Reihe (Küstenpflanzen, 2 Teil.), *Natur. Natursch. Mecklenb.*, **5**, 127-213. Maps showing the distribution of a number of maritime species in Europe are given, with accompanying text.—[D.H.K.]

Gehu, J. M., 1965, Observationes nouvelles pour une flore du Nord de la France, *Bull. Soc. Bot. N. Fr.*, **18**, 231-239. Notes on a number of interesting species found in northern France, many of these occur also in Britain.—[D.H.K.]

Gehu, J. M. & Wattez, J. R., 1965, Notes sur la végétation des marais de la plaine maritime Picardie, *Bull. Soc. Bot. N. Fr.*, **18**, 144-163. Notes on the vegetation of various marshes in coastal areas of Picardie.—[D.H.K.]

Gensac, M. P., 1967, Les forêts d'Epicéa de Tarentaise. Recherches des différents types de Pessière, *Revue gén. Bot.*, **74**, 425-528. *Picea* forests have not hitherto been studied in France. A detailed account is given of seven different types, illustrated by tables.—[E.B.B.]

Giacomini, V., 1967, Le paysage végétal de la Sardaigne septentrionale, *Vegetatio*, **15**, 213-222. A general account of vegetational zones in the northern areas of Sardinia is provided with notes on climate and soil.—[E.B.B.]

Hadac, E. & Vana, J., 1967, Plant communities of mires in the western part of the Krkonoše Mountains, Czechoslovakia, *Folia Geobot. Phyto-Taxon.*, **3**, 213-253. Mire plant communities of the western Krkonoše mountains may be grouped in eleven associations and three alliances: *Caricion canescentis-buscae*, *Rhynchosporion albae* and *Oxycocco-Empetrion hermaphroditii*. The ecology, structure and geographical distribution of the communities, as well as the ecology of the species occurring in them are discussed.—[D.H.K.]

Hieke, K., 1967, Drevny Zámetkých parku Východoceského kraje, *Ved. Pracé Vyz. ust. okrasn. Zahrad., Pruhonicích*, **4**, 99-149. An analysis of the woody plants in the parks around the castles of eastern Bohemia, with notes on frequency, status, cultivars, etc.—[D.H.K.]

Hilbig, W., 1966, Die Bedeutung der Ackerunkrautgesellschaften für die pflanzengeographische Gliederung Thüringens, *Feddes Rep.*, **73**, 108-140. The author stresses the importance of studying weed associations in connection with phytogeographical classifications in Thüringia.—[D.H.K.]

Hilbig, W., 1967, Die Ackerunkrautgesellschaften Thüringens, *Feddes Rep.*, **75**, 83-191.

Hocquette, M., Gehu, J. & Fauquet, M., 1965, Contribution a l'étude phytosociologique de l'estuarie de l'Authie, *Bull. Soc. Bot. N. Fr.*, **18**, 114-143.

Hodisan, I., 1967, Aspecte privinel vegetatia ruderal din Bazinul Fensului (Raionul alba Regionea Huneloura), *Contr. Bot.* ('*Univ. Babes Bolyai*'): *Omagia octogenarului professor Dr. docent Alexandra Borza*, 146-150. Phytosociological studies on ruderal associations in Romania.—[D.H.K.]

Hofmann, W., 1967, Laubwaldgesellschaften der Fränkischen Platte, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12**, 213-215.

Hohenester, A., 1967, Festuco-Sedetalia in Franken, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12**, 206-209.

Hohenester, A., 1967, Silbergrasfluren in Bayern, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12**, 11-21.

Holtom, A. & Greene, S. W., 1967, The growth and reproduction of Antarctic flowering plants, *Phil. Trans. R. Soc.*, **252** (777), 323-337. The presence of flowering plants in Antarctica has been known for nearly 150 years. The first species to be discovered was the grass, *Deschampsia antarctica* Desv., the second, a small cushion-forming pearlwort, *Colobanthus crassifolius* (D'Urv.) Hook. f.;

these two and *Deschampsia parvula* (Hook. f.) Desv., are the chief species studied in connection with growth and reproduction. The only known adventives which have survived Antarctic conditions are *Poa annua* and *P. pratensis*. The record of *Stellaria media* from the subcontinent is an error.—[D.H.K.]

Horvat, A. O., 1968, Die Hainbuchen-Eichenwälder der Meesek-Gegend in Südungarn, *Feddes Rep.*, **77,** 163-176.

Hubl, H., 1968, Zur Verbreitung und Vegesellschaftung der Hainbuche im östlichen Österreich, *Feddes Rep.*, **77,** 155-162.

Hummel, K., 1967, Die jahresperiodische Entwicklung der Blütenanlagen in der Flora von Mitteleuropa, *Bot. Jb.*, **87,** 399-430. Studies in the annual periodic development of floral primordia in a number of species in central Europe. These are markedly different for the various species and may be correlated with temperature, rainfall, day length, etc.—[D.H.K.]

Jage, H. & Jage, I., 1967, Zur Flor der Altmark, 1. Die genewärtige Situation einiger altmärkischer Salzstellen, *Verh. Bot. Ver. Prov. Brandenb.*, **104,** 54-62.

Jahn, H., Nespiak, A. & Tuxen, R., 1967, Pilzsoziologische Untersuchungen in Buchenwalden (Carici-Fagetum, Melico-Fagetum und Luzulo-Fagetum) des Wesergebirges, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 159-197.

Jakucs, P., 1967, Phyllitidi-Aceratum subcarpaticum im nordöstlichen Teil des Ungarischen Mittelgebirges (Kalkstein-Schluchtwalder) der Bükk-Gebirger und des Tornaer Kortsgebieter, *Acta Bot. Sci. Hung.*, **13,** 61-80. Phytosociological studies on the ravine forest association *Phyllitidi-Aceratum subcarpaticum* on limestone situations in Hungary.—[D.H.K.]

Jansen, M. T., Leys, H. N. & De Wilde, J. J. F. E., 1968, Stinsenflora in de Bommelerwaard, *Gorteria*, **4,** 12-15. A short account of the flora of a park near the castle of Rossum (prov. Gelderland), Netherlands. This flora closely resembles that of several old country-seats ('stinsen') in the province of Friesland.—[D.H.K.]

Jesson, K., 1968, Flora og vegetation på reservatet Vorsø i Horsens Fjord, *Bot. tidsskr.*, **63,** 1-201. An account of the flora and plant associations of Vorsø, an island off the east coast of Jutland administered as a nature reserve by the University of Copenhagen.—[D.H.K.]

Kapenen, T., 1967, On the dynamics of the vegetation and flora in Karkali Nature Reserve, Southern Finland, *Ann. Bot. Fenn.*, **4,** 121-218.

Kielland-lund, J., 1967, Zur Systematik der Kieternwälder der Fennoscandiens, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 127-141.

Knauer, N., 1967, Einfluss von Alter und Bewirtschaftung auf die Narbenzusammensetzung von Weidelgras-Weiden, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 54-64.

Kórnas, J., 1968, Der Linden-Eichen-Hainbuchen-Wald (Tilio-Carpinetum) in den polnischen Karpaten, *Feddes Rep.*, **77,** 143-153. Phytosociological studies on *Tilia-Quercus-Carpinus* forests in the Polish Carpathians.—[D.H.K.]

Kovaks, M. & Mathe, I., 1967, Die Vegetation des Inundationsgebietes der Ipoly, 1. Zönologische Untersuchungen, *Acta Bot. Sci. Hung.*, **13,** 133-168. Studies on plant communities bordering the river Ipoly in Hungary and Czechoslovakia.—[D.H.K.]

Krisai, R., 1966, Die Vegetationsverhältnisse des Kesselsee-Moores bei Wasserburg am Inn., Obb., *Ber. bayer. bot. Ges.*, **39,** 63-66.

Kunkel, G., 1967, Plantas vasculares: Nuevas adiciones para la Flora de Gran Canaria, *Cuad. Bot.*, **2,** 23-27. Additions are given to the flora of Grand Canary. Species which are new to the Canary Islands include *Juncus articulatus*, *Amaranthus albus*, *Calendula officinalis*, *Senecio cinerea* and *Rumex crispus*.—[D.H.K.]

Kytovuori, I. & Suominen, J., 1967, The flora of Ikkalanniemi (Commune of Virrat, central Finland), studied independently by two persons, *Annls. Bot. Fenn.*, **74.** Pp. 59. The two authors independently studied the flora of Ikkanlanniemi by the quadrat method, and a comparison is made of their individual findings in order to test the reliability of floristic observations and possible sources of error. The differences found in the personal observations of the two authors are discussed at length.—[D.H.K.]

Leandru, V. & Stanciu, G., 1967, Contributii la eunoasterea vegetatie forestiere din reservatia stiintifica Slatiora, *Comm. Bot.*, **59,** 131-141. Studies on forest vegetation in the scientific reservation at Slatiora, Romania.—[D.H.K.]

Lippert, W., 1966, Die Pflanzengesellschaften des Naturschutzgebietes Berchtesgaden, *Ber. bayer. bot. Ges.*, **39,** 67-122.

Ludi, W., 1967, Les Follatères, *Bull. Murithienne*, **84,** 6-11. A list of plants, with some indication of frequency, is given for this region of the Valais, which is threatened and should be protected as it has a somewhat unique flora.—[E.B.B.]

Lye, K. A., 1967, En ny inndeling av Norges plante-geografisk e element, *Blyttia*, **1967,** 88-123. The author outlines a new classification of Norwegian plant geographical elements. Genera and species are placed into one or more of 18 geographical elements according to their distribution in the country. The geographical elements recognised are described.—[D.H.K.]

Markgraf, V., 1967, Spät- und nacheiszeitliche Bildungs- und Vegetationsgeschichte eines Hoch moorrandes im Schweizerischen Mitteland, *Bot. Jb.*, **86,** 537-548. The development of vegetation since the late glacial period is discussed by an example of a 'moss' in mid Switzerland.—[D.H.K.]

McIntosh, R. P., 1967, The continuum concept of vegetation, *Bot. Rev.*, **33,** 130-187.

Merxmuller, H., 1965, Neue Übersicht der im rechtsrheinischen Bayern einheimeschen Farne und Blütenpflanzen, Teil 1, *Ber. bayer. bot. Ges.*, **38,** 93-115.

Mikyška, R., 1967, Vegetacní rekonstruckce lesu v Zálabí východocenske nížiny, 1. Stanovistní skupiny a klíe k urcení lesních spolecenstev oldasti, *Preslia*, **39,** 312-318.

Montelucci, G., 1967, Un fitotope pratense nel Salento (Galatina-Lecce), *G. bot. Ital.*, **101,** 179-182. A phytosociological account of the vegetation of old pasture land of the Puglia, Salento, Italy.—[D.H.K.]

Montserrat-Recoder, P., 1967, Floristica ibérica, 1, *Bol. Real. Soc. Espan. Hist. Nat.* (*Biol.*), **65,** 111-143. Notes on recent discoveries, and on the distribution of various vascular plants, in Spain with especial relevance to vol. 1 of *Flora Europaea*.—[D.H.K.]

Morariu, I., 1967, Clasificarea vegetatiei nitrofyle din Romania, *Contr. Bot.* ('*Univ. Babes Bolyai*'): *Omagio octogenarului professor Dr. docent Alexandra Borza*, 233-246. The author provides a classification of the nitrophilous plant associations of Romania.—[D.H.K.]

Muller, T., 1968, Die südwestdeutschen Carpinion-Gesellschaften, *Feddes Rep.*, **77,** 113-116. A phytosociological study of *Carpinus* forests in south-west Germany. —[D.H.K.]

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Nobuhara, H., 1967, Analysis of coastal vegetation on sandy shore by biological types in Japan, *Jap. J. Bot.*, **19**, 325-351. Many species which also occur in Britain are included in this study of coastal vegetation in Japan.—[D.H.K.]

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Oberdorfer, E., 1968, Studien in den Wäldern des Carpinion-Verbendes im Appennin und der Südwestgrenze des Vorkommens von Carpinus betulus, *Feddes Rep.*, **77**, 65-74.

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Pedrotti, C. C., 1967, L'Abetina di Varramista (Pisa). Flora fanerogamica e briologica e caratteristiche geobotaniche, *Webbia*, **22**, 39-65. Notes on the flora and vegetation of an *Abies alba* forest planted over a century ago in the Varramista Estate, near Pisa, Italy.—[D.H.K.]

Pietsch, W., 1967, Das Tamarici-Hippophaëtum, ein flussbegleitende Gebüsch-Gesellschaft in West-Transkaukasien, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12**, 65-87.

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Proctor, G. R., 1967, Additions to the flora of Jamaica, *Bull. Inst. Jamaica, Sci. Ser.*, **16**. Pp. 84. Adventive species now naturalised in Jamaica include *Hypochoeris radicata*, *H. glabra* and *Mercurialis annua* var. *ambigua*. The latter naturalised in a small area at St. Andrew is new to the Western Hemisphere though the typical plant is known to occur in Haiti and North America.—[D.H.K.]

Quezel, P., 1967, La végétation des hautes sommets du Pinde et de l'Olympe de Thessalie, *Vegetatio*, **14**, 127-228. The vegetation of these high mountain peaks in Greece is considered under main habitat headings. The various alliances and their constituent associations are described in detail and well illustrated by photographs and tables.—[E.B.B.]

Raraclaru, P., 1967, Vegetatia pajstilor din Masivul Rarau, *Comm. Bot.*, **5a**, 143-178. Phytosociological studies on the vegetation of grassland in the Rarau Massif, Romania.—[D.H.K.]

Resmerita, I., Csurös, S., Ghisa, E., Haring, P., Pop, I. & Spirchez, Z., 1967, Aspecte le dinamicii vegetatiei din Republica Socialista Romania, *Comm. Bot.*, **5a**, 26-46. A study of historical plant succession in Romania.—[D.H.K.]

Ritter-Studnicka, H., 1967, Über die Glaukeszenz an Serpentinpflanzen, *Ost. bot. Z.*, **114,** 101-114.

Rodenborg, L., 1967, Flora och vegetation i och vid Albrunna Lund på Södra Öland, *Svensk bot. Tidskr.*, **61,** 353-384.

Rodie, J., 1968, Des plantes adventices des Rues des Nice, *Riviera Scient.*, **55,** 11-14. Notes on the various species found growing by roadsides etc. in Nice, with a full list of species seen together with localities. Species which are commonly seen in such situations in Britain include *Conyza canadensis*, *Galinsoga parviflora*, *Polygonum convolvulus*, etc. Species rare in Britain which have been noticed as roadside weeds in Nice include *Fumaria capreolata* and *Bupleurum lancifolium* Hornem.).—[D.H.K.]

Runge, F., 1967, Vegetationsschwankungen im Rhynchosporetum, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 49-53.

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Schluter, H., 1967, Waldgesellschaften im Mittelthüringischen Trias-Hügelland, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 210-212.

Schluter, H., 1968, Zur Systematischen und räumlichen Gliederung des Carpinion in Mittelthüringischen, *Feddes Rep.*, **77,** 117-141.

Schönfelder, P., 1967, Das Galeopsietum angustifoliae Büker 1942—eine Kalkschuttpioniergesellschaft Nordbayerns, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 5-10.

Schretzenmayr, M., 1967, Der Aira flexuosa—Buchenwald (Markgraf 1925): Eine Betrachtung 40 Jahre Später, *Bot. Jb.*, **86,** 522-526.

Schubert, R., 1967, Das Lemno-Azolletum im Gebiet von Hundsmühlen bei Oldenberg, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 48.

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Sobotka, D., 1967, Róslinnosé strety zarastenia bezodplywowychjezior suwalszezyzny, *Monographiae bot.*, **23,** 175-259. Studies on the vegetation of the zones subject to overgrowth in endorheic lakes of the Suwalki region of Poland.—[D.H.K.]

Sonesson, M., 1967, Studies on mire vegetation in the Torneträsk area, Northern Sweden, 1. Regional aspects, *Bot. Notiser*, **120,** 272-296.

Stamer, R., 1967, Vegetationskundliche Untersuchungen an Schlatts der Osenberge und der Ahlhorner Forestes, *Mitt. Flor.-Soz. Arb., neue folge*, **11-12,** 28-47.

Sutter, R., 1967, Über Vorkommen und Verbreitung der Orchideen in ihrer Beziehung zu den Pflanzengesellschaften in der Orignagruppe (Lago di Como), *Bauhinia*, **3,** 269-290.

Szukkó-Lacza, J., 1967, 1, Beiträge zur Kenntnis der Pflanzengesellschaften des Börzsöny-Gebirges. Die Assoziationen Tilio-Fraxinetum, Mercuriali-Tilietum matricum, Spiraeetum media, 2. Lebensform-Honogennitätsuntersuchungen, *Ann. Mus. Hung.*, **59,** 147-161.

THIERET, J. W., 1967, Thirty additions to the Louisiana flora, *Sida*, **3**, 123-127. Additions to the flora of Louisiana include *Bromus mollis*, *Allium ampeloprasum*, *A. vineale*, *Myriophyllum spicatum*, *Torilis arvensis* and *Sherardia arvensis*.—[D.H.K.]

THORSTEINSSON, I. & STEINDÓRSSON, S., 1967, *Islenzk Beitiland Hrunaamanna-Flóa-gg Skeidamanna—og gnupverjaafréttir*, Rit Landbunadardeildar A—Flokkur-Nr. 19/Dept. of Agriculture Reports, series A—No. 19. Pp. 40. Reykjavik. An account of the vegetation of three highland commons in southern Iceland.—[D.H.K.]

TUXEN, R., 1967, Corynephoretea Canescentis, *Mitt. Flor.-Soz. Arb.*, *neue folge*, **11-12**, 22-24.

TUXEN, R., 1967, Ausdarnde nitrophile Saumgesellschaften mitteleuropas, *Comm. Bot.* ('*Univ. Babes Bolyai*'): *Omagia octogenarului professor Dr. docent Alexandra Borza*, 431-453.

UBRIZSY, G., 1967, Recherches sur la végétation de mauvaises herbes des vignes en Hongrie, *Acta Bot. Acad. Sci. Hung.*, **13**, 325-354. A detailed study of weed associations of vineyards in Hungary, carried out over a period of 12 years. *Stellaria-Lamium* develops in the autumn and becomes dominant in the spring, but is replaced in summer by *Convolvulus-Portula*, *Portulaca-Digitaria*, *Conyza canadensis-Setaria viridis*, *Amaranthus-Portulaca*, etc. Attention is given to the effects of herbicides on these weeds.—[E.B.B. & D.H.K.]

VASSEUR, J., 1968, Sur quelques plantes observées dans la région de Fontainebleau en 1967, *Bull. Assoc. Nat. Loing*, **44**, 36. A note on a few of the interesting species recorded from the Fontainebleau area in 1967.—[E.B.B.]

VICOL, E. C., SCHNEIDER-BINDER, E. & COLDEA, G., 1967, Consideratii a supra associatiei Empetro-Vaccinietum Br.-Bl. 1926 din carpatii Romaniei, *Comm. Bot.* ('*Univ. Babes Bolyai*'): *Omagio octogenarului professor Dr. docent Alexandra Borza*, 455-463. A survey of the *Empetro-Vaccinietum* association in the Romanian Carpathians.—[D.H.K.]

VISA, M. & BORG, P., 1967, Notes on the euhemerobic vegetation of Hämeeninna, *Mem. Soc. Fauna Flora fenn.*, **43**, 37-44. Studies carried out over a period of several years at Hämeeninna, southern Finland, on the structure and ecology of ruderal vegetation on trampled ground, low grasslands maintained by human influence, weeds of kitchen gardens and flower-beds, etc.—[D.H.K.]

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WELBOURN, R. M. & LANGE, R. T., 1967, Subdividing vegetation on interspecific associations, *Vegetatio*, **15**, 129-136.

WIEMANN, P. & DONKE, W., 1967, Pflanzengesellschaften der östfriesischen Insel Spiekeroog, *Mitt. Staats. Allgem. Bot. Hamburg*, **12**, 191-353. Phytosociological studies on the East Friesian island of Spiekeroog.—[D.H.K.]

YARRANTON, G., 1967, Organismal and individualistic concepts and the choice of methods of vegetation analysis, *Vegetatio*, **15**, 114-116.

ZEIDLER, H. & STRAUB, R., 1967, Waldgesellschaften mit Kiefer in der heutigen potentiellen natürlichen Vegetation des mittleren Maingebietes, *Mitt. Flor.-Soz. Arb.*, *neue folge*, **11-12**, 88-126.

CHROMOSOME SURVEYS

Bacquaer, S. R. & Husain, S. A., 1967, Chromosome studies in flowering plants of West Pakistan, 1, *Phyton* (*Argentina*), **24**, 49-55. The following chromosome numbers are reported from West Pakistan—*Melilotus indica*, a common annual weed, $n = 8$; *M. alba*, a common weed of gardens, $n = 8$; *Anagallis arvensis*, $n = 20$, and *Convolvulus arvensis*, $n = 25$.—[D.H.K.]

Curran, P. L., 1968, Chromosome numbers of some Irish plants, *Ir. Nat. J.*, **16**, 7-9. The following chromosome numbers are reported from counts made on Irish material:—*Aquilegia vulgaris*, $2n = 14$; *Sinapis arvensis*, $2n = 18$; *Brassica campestris*, $2n = 20$; *Raphanus raphanistrum*, $2n = 18$; *R. maritimus*, $2n = 18$; *Alliaria petiolata*, $2n = 42$; *Lotus corniculatus*, $2n = 24$; *Sedum acre*, $2n = 80$; *Anthriscus sylvestris*, $2n = 16$; *Sonchus asper*, $2n = 18$; *S. oleraceus*, $2n = 32$; *S. arvensis*, $2n = 54$; *Solanum dulcamara*, $2n = 24$; *Dactylis glomerata*, $2n = 28$; *Arrhenatherum elatius*, $2n = 28$ and *Holcus lanatus*, $2n = 14$.—[D.H.K.]

Delay, J., 1967, Halophytes, *Inf. Ann. Carosyst. Cytogen.*, **1**, 11-14. Chromosome numbers given for a number of French species of halophytes include *Jasione montana* var. *maritima* Dufour, $n = 6$; *Cakile maritima*, $n = 9$; *Brassica oleracea*, $n = 9$; *Matthiola sinuata*, $n = 7$; *Pyrola rotundifolia* var. *arenaria*, $n = 23$; *Lycium halimifolium*, $n = 12$; *Solanum dulcamara*, $n = 12$; *Tripleurospermum maritimum* subsp. *maritimum*, $n = 9$ and *Beta vulgaris* subsp. *maritima*, $n = 9$. —[D.H.K.]

Hedberg, O., 1967, Chromosome numbers of vascular plants from arctic and sub-arctic North America, *Ark. Bot.*, **6** (4-5), 309-326. A number of chromosome counts are given for species from Arctic and sub-Arctic North America. The following are included:—*Triglochin maritimum sensu lato*, $2n = 48$; *Hierochloe odorata*, $2n = 70$; *Alopecurus alpinus*, $2n = c.\ 100 \pm$; *Calamagrostis neglecta sensu lato*, $2n = c.\ 40 \pm$; *Deschampsia cespitosa*, $2n = c.\ 30\text{-}34$; *Festuca rubra*, $2n = 49 \pm$; *Hordeum jubatum*, $2n = 28$; *Eleocharis palustris*, $2n = 36 \pm$; *Carex bicolor*, $2n = 52$; *C. atrofusca*, $2n = c.\ 42 \pm$; *C. capillaris*, $2n = c.\ 50$; *Tofieldia pusilla*, $2n = 30$; *Salix reticulata*, $2n = 38 \pm$; *Cerastium alpinum*, $2n = 72 \pm$; *Minuartia rubella*, $2n = 24$; *Silene acaulis*, $2n = 24$; *Lychnis alpina*, $2n = 24$; *Caltha palustris*, $2n = 60 \pm$; *Saxifraga cernua*, $2n = c.\ 70$; *S. nivalis*, $2n = c.\ 56$; *S. oppositifolia sensu lato*, $2n = 52 \pm$; *Parnassia palustris*, $2n = 18$; *Sibbaldia procumbens*, $2n = 14 \pm$; *Lupinus nootkatensis*, $2n = 48$; *Astragalus alpinus*, $2n = 32$; *Arctous alpinus*, $2n = 26$; *Vaccinium uliginosum*, $2n = c.45 \pm$; *Achillea millefolium*, $2n = 36$ and *Senecio congestus*, $2n = 48$.—[D.H.K.]

Löve, A. (Editor), 1967-68, IOPB Chromosome number reports, 13, *Taxon*, **16**, 445-461. The following chromosome numbers are given: *Phleum alpinum*, $2n = 28$; *Listera cordata*, $n = 19$ (from Canada); *Rumex alpinus*, $2n = 20$ (from Romania); *Rumex conglomeratus* subsp. *conglomeratus*, $2n = 20$; *R. crispus*, $2n = 60$; *R. longifolius*, $2n = 60$; *R. obovatus*, $2n = 40$; *R. obtusifolius* subsp. *transiens*, $2n = 40$; *R. pulcher* subsp. *pulcher*, $2n = 20$; *R. sanguineus*, $2n = 20$ (all from Sweden); *Rumex dentatus* subsp. *halacsyi*, $2n = 40$ (from Georgia, U.S.S.R.); *Rumex nepalensis* Spreng., $2n = 120$ (from Lebanon); *Rumex patientia* subsp. *orientalis*, $2n = 60$ (from Syria); *Rumex patientia* subsp. *patientia*, $2n = 60$ (from Georgia, U.S.S.R.); *R. pseudonatronatus* Borbás, $2n = 40$ (from Finland); *Rumex pulcher* subsp. *divaricatus* (L.) Murb., $2n = 20$ (from Italy); *Erigeron strigosus*, $n = 35\text{-}36$ (from Canada); *Saussurea alpina*, $n = 24$ (from Leningrad Botanic Garden): 14, *loc. cit.*, **16**, 552-571. The following are included in recently determined chromosome counts:—*Festuca ovina* L. var. *alpina* (Wimm.) Gren. & Godr., $2n = 14$ (from Japan); *Lychnis alpina*, $n = 12$; *Fumaria officinalis*, $n = 16$; *Lathyrus japonicus*, $n = 7$; *Carum carvi*, $n = 10$; *Mertensia maritima*,

$n = 12$; *Rhinanthus minor*, $n = 7$; *Galium mollugo*, $n = 12$; *Campanula rotundifolia*, $n = 34$; *Chrysanthemum ircutianum* Turcz., $n = 18$ (all from Canada); *Erigeron alpinus*, $n = 9$; *Guizotia abyssinica* (L.) Cass., $n = 15$; *Hypochoeris glabra*, $n = 5$; *Solidago virgaurea*, $n = 9$ (all from India): 15, *loc. cit.*, **17,** 91-104. Among recent chromosome counts are the following:—*Triglochin maritimum* L., *sensu lato*, $n = 48$; *Deschampsia flexuosa*, $2n = 28$; *Allium schoenoprasum*, $2n = 16$; *Armeria maritima*, $2n = 24$; *Campanula rotundifolia*, $n = 34$ (all from Canada); *Phleum alpinum*, $2n = 28$; *Myriophyllum verticillatum*, $n = 14$; *Campanula rotundifolia*, $n = c.\ 51$; *Artemisia vulgaris*, $n = 8$, $2n = c.\ 27$ and 36 (all from the U.S.A.); *Chenopodium album*, $n = 9$ (from W. Pakistan): 16, *loc. cit.*, **17,** 199-204. Further chromosome counts include the following:—*Lagurus ovatus*, $2n = 14$ (from Greece); *Myosoton aquaticum*, $2n = 28$ (from Switzerland); *Sagina nodosa*, $2n = 56$ (from Iceland); *Ranunculus flammula*, $2n = 32$ (from the Faeroes); *R. repens*, $2n = 32$ (from Finland); *Sedum album*, $2n = 68$; *Jasione montana*, $2n = 12$ (both from Italy); *Potentilla tabernaemontani*, $2n = 42$; *Pilosella peleteriana*, $2n = 18$ (both from the Netherlands); *Trifolium scabrum*, $2n = 10$; *Mentha aquatica*, $2n = 96$ (both from France); *Puccinellia distans*, $2n = 42$; *Tragopogon pratensis*, $2n = 12$ (both from Bulgaria).—[D.H.K.]

Zickler, D. & Lambert, A.-M., 1967, Espéces singulières de la flora d'Alsace, *Inf. Ann. Caryosyst. Cytogen.*, **1,** 3-10. Chromosome numbers are given for a number of species from Alsace.—[D.H.K.]

HISTORICAL

Copeman, W. S. C., 1967, *The Worshipful Society of Apothecaries of London. A History 1617-1967*. Pp. 112 + 19. Pergamon Press. Oxford, London and New York. Price 63/-. Includes brief details of John Parkinson (1567-1603), Thomas Johnson (1604-44), James Sherard (1666-1730), Isaac Rand (*d.* 1743), James Petiver (1658-1718) and John Gerarde (1545-1612).—(D.H.K.)

Curtis, E. W., 1967, Glasgow Botanic Garden, *Gdnrs' Chron.*, **162** (26), 16-17. A short account of the history of the Glasgow Botanic Garden which recently celebrated its 150th anniversary.—[D.H.K.]

Dimbleby, G. W., 1967, *Plants and Archaeology*. Pp. 187 + 23 plates. John Baker, London. Price 50/-. An extremely interesting account of man and plants, including chapters on wild plants as sources of food and drink, early domestic, ritual and medicinal uses of plants, and the nature and interpretation of the evidence of palynological material.—[D.H.K.]

Granel de Solignac, L. & Bertrand, L., 1967, Les herbiers de l'Institut de botanique de Montpellier, *Naturalia monspel., sér. Bot.*, **18,** 271-292. An account of the many important herbaria contained in the Botanical Institute of Montpellier, which is considered not only the most important in France, second to that of the Museum of Paris, but can be compared with the herbaria of the most important capitals of Europe. Among the chief collections are those of A. Jordan (1814-97), J.-E. Planchon (1823-88), E. Neyraut (1859-1942). Many families and genera have also been critically examined and revised by international specialists.—[D.H.K.]

Ingwersen, W., 1968, A reflection on worts, *Gdnrs' Chron.*, **163** (6), 14-15. Notes on the origin of the word 'wort', with some illustrations of its usage in vernacular plant names.—[D.H.K.]

Leroy, J. F., 1960, *Darwin et la théorie moderne de l'evolution*. Pp. 209. Collection Savants du monde entier no. 29. Editions Seghers, Paris.

Löve, A. & Löve, D., 1967, Evolution and the Linnaean Species, *Contr. Bot.* (*'Univ. Babes Bolyai'*): *Omagia octogenarului professor Dr. docent Alexandra Borza*, 203-210.

Matthews, L. G., 1967, *The Royal Apothecaries*. Pp. xiv + 191. The Wellcome Historical Medical Library. London. Price 25/-. Contains some biographical data on a few early British botanists.—[D.H.K.]

McVaugh, R., 1968, Rare old publications in Michigan herbaria, *Michigan Bot.*, **7**, 3-13. Notes on a number of rare Horti Sicci which are preserved at the University of Michigan Herbarium. These include Asa Gray's *North American Gramineae and Cyperaceae*; N. C. Seringe's *Saules de la Suisse*, published in 5 fasciculi between 1805 and 1808, and of particular interest to British botanists Mariano La Gasca's *Hortus Siccus Londinensis* of which no complete set is believed to exist in the British Isles. Three complete sets were located in Mexico City, and one of these was acquired by the University of Michigan. The full title of the collection is '*Hortus Siccus Londinensis: or, a Collection of dried specimens of Plants, growing wild within twenty miles round London, named on the Authority of the Banksian Herbarium and other original collections*'. The first fasciculus, containing 25 plants with accompanying text appeared in December 1826; fasciculi 2 and 3 contained 55 plants and text appeared in 1827, and fasciculus 4 containing 40 plants (Nos. 81-110), and a 'Supplementum' (Nos. 111-120) also appeared in 1827. La Gasca was assisted by his two elder sons in collecting the plants, many of which came from the Hampstead area.—[D.H.K.]. An incomplete set is at the Botany School, University of Oxford (cf. G. C. Druce, *J. Bot.*, **46**, 163 (1908)).—[D.H.K.]

Morton, C. V., 1967, The fern herbarium of André Michaux, *Am. Fern J.*, **57**, 167-182. The author has examined the fern herbarium of André Michaux (1746-1802) at the Muséum National d'Histoire Naturelle in Paris, and provides notes on many historical gatherings, chiefly of American species.—[D.H.K.]

Page, C., 1968, The Linnean Society of London, *Gdnrs' Chron.*, **163** (4), 22-23. A short history of the Linnean Society of London.—[D.H.K.]

Scannell, M. J. P., 1968, County Kerry: The vice-counties, *Ir. Nat. J.*, **16**, 20. It is pointed out that the vice county boundary for Co. Kerry is incorrectly delineated in the transparent overlay supplied with the Atlas of the British Flora. The correct boundaries of H.1, S. Kerry and H.2, N. Kerry are outlined.—[D.H.K.]

Schwanitz, F., 1967, *Die Evolution der Kulturpflanzen*. Pp. xii + 463, with 177 illustrations in the text. Bayerischer Landwirtschaftsverlag. München, Basel, Wien. Price DM.124.

Shetler, S. G., 1968, *The Komarov Botanical Institute:* 250 *years of Russian research*, Pp. xiv + 240. Smithsonian Institute Press. Price $5.95. An account of the history and work of the world famous Komarov Botanical Institute in Leningrad. —[D.H.K.]

Stafleau, F. A., 1967, Taxonomic Literature. A collective guide to botanical publications with dates, commentaries and types, *Regn. Veg.*, **52**. Pp. xxx + 556. An annotated catalogue, arranged alphabetically under authors' names with brief biographical details, references to publications, location of herbaria, biographies, etc.—[D.H.K.]

Stearn, W. T., 1967, Meisner's Plantarum Vascularium Genera, *J. Soc. Biblphy nat. Hist.*, **4**, 291-297. Publication dates are provided for the various parts of the Swiss botanists C. F. Meisner's *Plantarum vascularium Genera secundum Ordines Naturales ordinata* (1837-43), and a list of genera with publication dates is tabulated. A short biographical account of C. F. Meisner (1800-74) is also given. —[D.H.K.]

Stearn, W. T., 1967, Pteridological publications of G. H. Mettenius, *J. Soc. Biblphy nat. Hist.*, **4**, 287-290. Most of the pteridological publications of G. H. Mettenius (1823-66) were issued both as part of *Abhandlungen herausgegeben von der Senckenbergischen Naturforschen den Gesellschaft* of Frankfurt am Main and as a separate. The dates of publication of the first four volumes of this periodical containing Mettenius's papers are given in great detail. A biographical account of Mettenius is also given.—[D.H.K.]

Stearn, W. T., 1967, Hill's The British Herbal (1756-1757), *Taxon*, **16**, 494-498. *The British Herbal* by John Hill was published in 52 parts between 24 January 1756 and 28 January 1757. Each part normally consisted of two sheets (8 pages) and three plates, or of three sheets (12 pages) and two plates. A detailed list of the contents of the various parts and the precise dates of publication is given based on announcements in a London daily newspaper, 'The Public Advertiser'.

Hill's nomenclature and taxonomy, and especially the status of his names under the *International Code of Botanical Nomenclature* are discussed.—[D.H.K.]

Stearn, W. T., 1968, The botanical results of the Endeavour voyage, *Endeavour*, **100**, 3-10. An account of the great botanical value of plants accumulated and described by Banks and Solander during Cook's great voyage of circumnavigation in the 'Endeavour' in 1768-1771.—[D.H.K.]

Valovirta, E. J., 1967, Lars Levi Laestadiuksen Kasvikokoelma Jyväskylässä, *Mem. Soc. Fauna Flora fenn.*, **43**, 78-79. An account of the herbarium of the Swedish botanist Lars Levi Laestadius (1800-1861), now at the University of Jyväskylä. The herbarium is rich in critical material of *Betula*, *Salix*, *Eriophorum*, *Sparganium*, *Potamogeton* and *Carex*.—[D.H.K.]

Van Ooststroom, S. J. & Mennema, J., 1967, De Gorter's Flora Belgica tweehonderd jaar oud, *Gorteria*, **3**, 201-202. Two centuries ago in 1767, David de Gorter's *Flora Belgica* was published. It was the first flora covering the whole territory of the Netherlands in which Linnaeus's binomial nomenclature was applied. It is to be regretted that by far the greater part of the Netherlands herbarium of De Gorter was lost.—[Authors' summary]

Widder, F. J., 1967, Die Grazer Ausgaben von Linnés Amoenitates Academicae, *Bot. Jb.*, **86**, 186-208.

BIOGRAPHICAL

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Bagshaw, T. W., 1967, Worthington Smith Anniversary, 1. 'W.G.S.'. A man to remember, *Bedford Mag.*, **11**, 73-78. Some personal recollections of the botanical artist Worthington George Smith (1835-1917).—[D.H.K.]

Barlow, N. (Editor), 1967, *Darwin and Henslow: The Growth of an idea: Letters* 1831-1860. Pp. xii + 251 + 8 plates + 2 maps. Bentham-Moxon Trust. John Murray, London. Price 35/-.

Bristowe, W. S., 1967, More about Joseph Dandridge and his friends James Petiver and Eleazar Albin, *Entom. Gaz.*, **18**, 197-201.

Casper, S. Jost, 1967, Zur Bibliographie der Schmidelschen 'Icones plantarum et analyses partium', *Taxon*, **16**, 371-382.

Dickinson, A., 1967, *Carl Linnaeus Pioneer of Modern Botany*. Pp. ix + 209. Immortals of Science Series. Franklin Watts, Inc. New York. An account of the life of Linnaeus.—[D.H.K.]

Dony, J. G., 1967, Bedfordshire biographies, 39. A Bedfordshire botanist and schoolmaster, *Bedford. Mag.*, **11**, 69-72. A biographical account of Charles Abbot (*d.* 1817).—[D.H.K.]

Heinis, F., 1967, Joh. Anton Müller (Olsberg). Ein Beitrag zur Geschichte der floristischen Erforschung der Nordschweiz, *Bauhinia*, **3**, 291-298. An account of the botanical studies of Joh. Anton Müller (1775-1836) on the flora of northern Switzerland.—[D.H.K.]

Holttum, R. E., 1967, John Smith of Kew, *Br. Fern Gaz.*, **9**, 330-334. An account of the life of John Smith (1798-1888), one of the leading pteridologists of the 19th century.—[D.H.K.]

Jeffers, R. H., 1968, *The Friends of John Gerard* (1545-1612) *Surgeon and Botanist.* Pp. 99. Colchester. Price 30/-. Contains biographical notes on Matthias de l'Obel, and other contemporaries of John Gerarde.—(D.H.K.)

Lovis, J. D., 1967, Fern hybridists and fern hybridising, 1. The work of Edward Joseph Lowe (1825-1900), *Br. Fern Gaz.*, **9**, 301-308.

Martin, D. J., 1967, Former Suffolk Naturalists, 1. John Stevens Henslow, *Trans. Suffolk Nat. Soc.*, **13**, 406-408.

Marza, V. D. & Cerchez, N., 1967, Charles Naudin, a pioneer of contemporary biology, [1815-1899], *J. Agr. trop. Bot. appl.*, **14**, 371-401.

Massingham, B., 1967, Gertrude Jekyll—'Home and Garden', *Gdnrs' Chron.*, **162** (14), 7.

Rozeira, A., 1966, Gonçalo Sampaio—o botanico eo mestre, *Bolm. Soc. port. Ciênc. nat., ser.* 2*A*, **11** (1), 27-45. An account of the Botanical activities of G. A. de Silva Ferreira Sampaio (1865-1937), the celebrated Portuguese botanist.—[D.H.K.]

Stafleu, F. A., 1966, W. Miquel, Netherlands Botanist, *Wentia*, **16**, 1-95. A detailed biographical account of W. Miquel (1811-1871), including a full list of his publications.—[D.H.K.]

Street, J., 1968, The man behind the name, E. A. Bowles, 1865-1954, *Amat. Gard.*, **85**, 40.

Street, J., 1968, The man behind the name, Charles Robert Darwin, 1809-82, *Amat. Gard.*, **85**, 41.

Young, B. & Young, J., 1966, *Plant Detective: David Douglas.* Pp. 189. New York. An account of the life and botanical achievements of David Douglas (1799-1834).—[D.H.K.]

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Dennis, Norman, 1912-66: *Proc. Linn. Soc.*, **179**, 145 (1968).

Hastings, Somerville, 1878-1967: *Reading Nat.*, **20**, 52 (1968).

Nolte, Margarethe, 1895-1967: *Taxon*, **16**, 572 (1967).

Nyarady, Erasmus Julius, 1881-1966: *Taxon*, **16**, 425-430 (1967).

Parodi, Lorenzo Raimundo, 1895-1966: *Taxon*, **16**, 522-533 (1967): *Proc. Linn. Soc.*, **179**, 145 (1968).

Savage, Spencer, 1886-1966: *Proc. Linn. Soc.*, **179,** 145 (1968).

Sherff, Earl Edward, 1886-1966: *Taxon*, **17**, 189-198 (portr.) (1968).

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Stiles, Walter, 1886-1966: *Biogr. Mem. Fellows R. Soc.*, **13,** 402 (1967).

Watt, Helen Winifred Boyd, 1879-1968: *Proc. Bournemouth Nat. Sci. Soc.*, **57,** 23-24 (1968).

Williams, Robert Orchard, 1891-1967: *Proc. Linn. Soc.*, **179,** 145 (1968).

PALAEOBOTANY

Crabtree, K., 1968, Pollen analysis, *Sci. Progr.*, **56,** 83-101. Pollen grains are the earliest reliable and recognizable remains of the flowering plants yet found. They occur in deposits dating back to the end of the Jurassic period and as their detailed structure is often so well preserved, the pollen grains may be identified to many species of tree, grass and herb. Their structures have been utilised by botanists in studies of evolution and of taxonomy, while geologists have used their presence for making stratigraphical correlations. Pollen analysis has largely been concerned with the identification and counting of pollen grains in Quaternary deposits. Increasing use is being made of quantative pollen spectra in providing evidence of climatic change and vegetational history, and in the study of the interrelationships between man, soil, climate and vegetation. Pollen analysis will continue to be one of the basic tools in detailed analysis of deposits containing organic remains.—[Author's summary]

Godwin, H., 1968, Studies of the Post-Glacial history of British vegetation, 15. Organic deposits of Old Buckenham Mere, Norfolk, *New Phytol.*, **67,** 95-107.

Havinga, A. J., 1968, Some remarks on the interpretation of a pollen diagram of a podsol profile, *Acta bot. neerl.*, **17,** 1-4. Two different interpretations of a pollen diagram of a podsol described by Heim (*Bull. Assoc. Franc. Etude Quat.*, **3,** 208-216, 1966) are compared, viz. the latter's interpretation and that preferred by the present author. Unlike Heim, the present author attaches among other things a great significance to the effect of biological activities on the pollen distribution in a sandy soil.—[Author's summary]

Helbaek, H., 1966, Vendeltime farming products at Eketorp on Öland, Sweden, *Acta Archaeologica*, **37,** 216-221. Excavations at the fortified village of Eketorp on Öland, Sweden, in 1965-66 have revealed pollen-grains of sixth century A.D. cultivated species and their attendant weeds. Cultivated species included *Hordeum polystichum*, *Secale cereale*, *Triticum vulgare*, *Avena sativa*, *A. fatua*?, while associated weeds included *Bromus* cf. *mollis*, *Festuca* sp., *Lolium perenne*, *Rumex acetosella*, *Polygonum convolvulus*, *P. lapathifolium*, *P. aviculare*, *Chenopodium album*, *Atriplex* sp., *Agrostemma githago*, *Camelina sativa*, *Linum usitatissimum*, *Rhamnus catharticus*, *Convolvulus arvensis*, *Galium spurium* and *G. palustre*. The present distribution of the various weed species in Denmark is reviewed.—[D.H.K.]

Hohenstatter, E., 1966, Pollen analytische und stratigraphische Untersuchung eines Profiles aus dem Eschenloher Moor, unter Einbeztehung der tierischen Fossilien, *Ber. bayer. bot. Ges.*, **39,** 57-61.

Kedves, M., 1967, Sur quelques problèmes de stratigraphie palynologique appliquée au tertiare inférieur en Europe, *Pollen et Spores*, **9,** 321-334. Palynological studies in the Paris area.—[D.H.K.]

Lange, E., 1967, Zur Vegetationsgeschichte des Beerberggebietes im Thüringer Wald, *Feddes Rep.*, **76**, 205-219.

Manten, A. A., 1966, Half a century of modern palynology, *Earth-Sci. Rev.* (*Netherlands*), **2**, 277-316.

Nichols, H., 1967, Vegetational change, shoreline displacement and the human factor in the late quaternary history of south-west Scotland, *Trans. R. Soc. Edinb.*, **67**, 145-187.

Post, L. Von, 1967, Forest tree pollen in south Swedish peat bog deposits, [translation of original 1917 (?) paper by M. B. Davis and K. Faegri, etc.], *Pollen et Spores*, **9**, 375-401.

Zoller, H. & Kleiber, H., 1967, Über die postglaziale Einwanderung und Ausbreitung der Rotbuche (Fagus sylvatica L.) am südlichen Alpenrenat, *Bauhinia*, **3**, 255-264.

HERBARIUM, LABORATORY, RECORDING TECHNIQUES, ETC.

Bresinsky, A., 1966, Neue Methoden zur floristischen Erforschung Bayerns, *Ber. bayer bot. Ges.*, **39**, 29-34. Proposals are put forward for recording and mapping the flora of Bavaria by the grid-square method.—[D.H.K.]

Crosby, J. L., 1967, Computers in the study of evolution, *Sci. Progr.*, **55**, 279-292. An account of the principles of computer simulation of genetic systems and its application to the theoretical study of processes of evolution. The scope of this technique is illustrated by reference to a number of examples.—[Author's summary]

Crovello, T. J., 1967, Problems in the use of electronic data processing in biological collections, *Taxon*, **16**, 481-494. Problems in the use of electronic data processing (EDP) in biological collections are explored. To accomplish this, the uses of EDP, actual and potential, are first set forth. The uses are divided into three groups, depending on the source from which the relevant information is obtained. Each problem is discussed in detail. The concept of a decision context is introduced. Its use in making the overall decision as to whether or not EDP should be used in a particular situation is explained. A questionnaire on the problems of EDP in biological collections was returned by 22 curators. Their comments are incorporated into the appropriate places of the text.—[Author's summary]

Dupont, P., 1967, L'utilisation des résaux en cartographie floristique; perspectives européennes et perspectives françaises, *C.R. Somm. Soc. Biogeograph.*, **44**, 14-19. The advantages and disadvantages of using a grid system for plant recording and mapping are discussed. An account is also given of the project for mapping the flora of Europe, followed by an account of the mapping of the French flora. Illustrations are provided by two maps showing the distribution in France of one species, *Carduncellus mitissimus*.—[E.B.B.]

Dwyer, J. D., 1967, The plant collector, the herbarium and the field, *Bull. Missouri Bot. Gard.*, **55** (7), 3-9.

Fosberg, F. R., 1967, The cult of the expert and numerical taxonomy, *Taxon*, **16**, 369-370.

Jalas, J. & Suominen, J., 1967, Mapping the distribution of European vascular plants, *Mem. Soc. Fauna Flora fenn.*, **43**, 60-72.

Jenne, G., 1968, A portable forced air plant dryer, *Taxon*, **17**, 184-185. Describes and illustrates a portable electric plant dryer for use by botanists making extensive collections in the field. It is primarily designed for collectors engaged in collecting material for national herbaria on long distance excursions.—[D.H.K.]

Lalonde, L.-M., 1967, L'herbier de l'avenir en botanique expérimentale, *Provancheria*, **1**, 17-26.

MacNeill, N., 1968, Use and misuse of map gridding, *Ir. Nat. J.*, **16**, 2-4. Critical comments on the adoption of the British National Grid to cover Ireland as used in the preparation of the Atlas of the British Flora.—[D.H.K.]

Perring, F. H., 1967, Information retrieval technique for museums, *Class. Soc. Bull.*, **1**, 29-30. A paper read at a Symposium on the Application of Retrieval Techniques in the General Field of Biology, held at the Botanic Garden, Cambridge, in December 1966.—[D.H.K.]

Roberts, B. R., 1967, Notes on numerical analysis as applied to vegetation classification, *J.S. Afr. Bot.*, **33**, 241-246.

Shobe, W. R. & Lersten, N. R., 1967, A technique for clearing and staining gymnosperm leaves, *Bot. Gaz.*, **128** (2), 150-152.

Sneath, P., 1967, Numerical taxonomy: steps in preparing taxonomic data for the computer, *Class. Soc. Bull.*, **1**, 14-18.

Soó, R., 1967, Die moderne Systeme der Angiospermen, *Acta Bot. Sci. Hung.*, **13**, 201-233.

Steyermark, J. A., 1968, Notes on the use of formaldehyde for the preparation of herbarium specimens, *Taxon*, **17**, 61-64.

Williams, W. T., 1967, Numbers, taxonomy and judgement, *Bot. Rev.*, **33**, 379-386.

Wyatt, H. V., 1967, Research newsletters in the biological sciences—a neglected literature service, *J. Docum.*, **23**, 321-325. A number of informal biological newsletters have a limited circulation. In addition to social news some of these contain information about research in progress, research material and select bibliographies—these are called research newsletters and an analysis is made of the contents and scope of twenty-two of them. The bibliographies are of several types and that compiled from the publications of the recipient's newsletter is discussed and its cover compared with that of *Biological Abstracts*. Suggestions to improve the usefulness of the research newsletters are made.—[Author's summary]

Zahariadi, C. & Georgescu, C. C., 1967, Orientari noi în tazonomonia fanerogamelor, *Comm. Bot.*, **5a**, 47-58. Various new techniques in plant taxonomy, e.g. biometrical methods, biochemical studies, etc., are reviewed, and the continued importance of field work is emphasized.—[D.H.K.]

CLASSIFICATION, NOMENCLATURE AND BOTANICAL TERMINOLOGY

Böcher, T. W., 1967, Continuous variation and taxonomy, *Taxon*, **16**, 255-258. Ecotypical or other types of variation are very often clinal or at least subclinal. Only in very few cases, however, has the occurrence of clinal variation been proved experimentally. To distinguish between intraspecific clinal variation and a series of forms linking together two species (subspecies) as a result of introgressive hybridization is difficult and sometimes impossible. Many described subspecies or varieties, and sometimes even species, probably represent ends of clines bunched together in a certain region or environment. In many species the most conspicuous variation is ecoclinal and is not recognised taxonomically, while a number of less important deviations have been described taxonomically because they can be distinguished by qualitative characters. Subspecies and many varieties are not uniform and often show clinal variation. Subspecies and varieties are not genetically separated from other subspecies.

If clinal variation cannot be considered taxonomically, many—perhaps most—described subspecies must be eradicated. The description of the most conspicuous variational pattern in a great many species is also impeded. To find out whether or not a described subspecies or a conspicuously deviating race, which is not described, is connected with others by a smooth or a low and many-stepped character gradient, hundreds of samples from various parts of the range would have to be cultivated under uniform conditions. Such work would take a long time but would hardly solve the problem.

First, the decision about the height or size of a step or an interruption in the chain of variation required for taxonomical recognition will ultimately depend on an estimate. Second, clinal or abrupt types of variation found in nature are very difficult to prove experimentally. By cultivating hundreds of samples from many different stations, the degree of discontinuity can only be estimated. Some species have an abrupt type of variation because there is a sudden change in environment. If many samples are taken in the narrow transitional area where the two types are sympatric, experimental cultivation should show in many and perhaps in most cases that the variation is clinal in that area.

All these points, in my view, endorse the opinion that parts of clines sometimes ought to be described either as subspecies or varieties, especially when several clines are bunched. In such cases the request for a clear demarcation line cannot be complied with. Such a line may even be impossible to draw between certain taxa which are evaluated as species.

A description of the character combinations in areas where several clines are bunched can be made, however. The diagnosis of a subspecies (or a geographical-ecological variety) should be based upon the most common or typical character combination and include an estimate of the range of the character variation within the area. The normal taxonomic rules must be followed. Exactly where in a clinal or subclinal system a type specimen of a species is likely to be placed may be difficult to decide as the specimen may be extremely modified or grown in a garden. In most cases, however, it should be possible to determine whether the type is in the middle of the clinal system or at one of its ends.—[Author's summary]

BOIVIN, B., 1967, Connecting vowels in epithets of Latin origin, *Rhodora*, **69**, 451-455.

BRUMMITT, R. K., 1968, An analysis of the new names listed in the Index to European Taxonomic Literature for 1966, *Taxon*, **17**, 11-16. An analysis of new names published in European literature in 1966. The total number of new names listed in the author's 1966 'Index' (*Regn. Veg.*, **53**, (1968)), is 2,029 compared with 1,108 in the 1965 'Index'. The number of new specific names is 492, compared with 263 in 1965, though the former figure has been somewhat inflated by descriptions of new species of *Hieracium* and *Taraxacum*. A table summarizes the new taxa and is arranged under countries.—[D.H.K.]

BRUMMITT, R. K. & CHATER, A. O., 1967, On names published without clear indication of rank, *Taxon*, **16**, 403-406. A proposal is made to amend Article 35 of the *International Code of Botanical Nomenclature* dealing with names published without clear indication of rank. Such names published before 1953 should be treated as validly published but inoperative in questions of priority. If taken up later in a definite rank the new name should be regarded as a new combination with the original name as the basionym.—[Authors' summary]

CLAYTON, W. D., 1968, The correct name of the Common Reed, *Taxon*, **17**, 168-169. The correct name for the Common Reed, usually called *Phragmites communis* Trin., is **P. australis** (Cav.) Trin. ex Steudel.

The Common Reed is rightly regarded as based upon a Linnaean species (*Arundo phragmites* Linn., 1753), and one is inclined to forget that, owing to the operation of the tautonym rule, the current name (*Phragmites communis* Trin.) dates only from 1820. This may explain why the existence of an earlier name has been overlooked.—[Author's summary]

Czerepanov, S., 1967, Index taxorum novorum florae Unionis Rerum Publicarum Socialisticarum Sovieticarum, in annis 1934-1966 post publicationem 'Florae U.R.S.S.' valide editorum, *Nov. Syst. Plant. Vasc.*, **1967,** 3-142. An annotated list of new species described from the Soviet Union between 1934 and 1966 with details of the sources of publication. The list is arranged alphabetically under genera.—[D.H.K.]

Dandy, J. E., 1967, Index of generic names of vascular plants, 1753-74, *Regn. Veg.*, **51.** Pp. 130.

Denffer, D. von, 1967, Ein Vorschlag zur Vereinheitlichung der Sporennomenklatur, *Ber. dt. bot. Ges.*, **80,** 371-375. Notes on the terminology of spores.—[D.H.K.]

Hendrych, R., 1966, A list of the subgenera recognised by Petermann (1846-49), *Nov. Bot. Hort. Bot. Univ. Prag.*, **1966,** 29-37.

Holub, J., 1967, Remarks on the nomenclature of 'Dryopteris borreri Newman 1854', *Folia Geobot. Phyto-Taxon.*, **3,** 329-332. The author points out that Newman in his *History of British Ferns*, edition 3 (1854) cited under varieties: 'Dryopteris borreri: D. filix-mas var. borreri'.

The majority of authors have taken the two designations as being attributable to alternative names for the same taxon, but a study of Newman's books shows that he did not accept *D. borreri* as a species, and accordingly did not create a valid name for it at specific rank. A study of the nomenclature of the taxon reveals that it is necessary to create a new name for it, and it is accordingly named **D. pseudo-mas** (Wollaston) Holub & Pouzar, comb. nov., based on *Lastrea pseudo-mas* Wollaston (1855, *The Phytologist*, **1,** 172).—[D.H.K.]

Jeffrey, C., 1968, Systematic categories for cultivated plants, *Taxon*, **17,** 109-114. Though there is no absolute distinction between the systematics of wild and cultivated plants, cultivated plants in general do differ in many respects from typical wild species. These differences are considered and their implications for the systematics of cultivated plants are discussed. It is concluded that while formal botanical categories can successfully accommodate both wild and cultivated plants down to the species level (i.e. the level of the binomial), they are inapplicable to the infraspecific levels of the systematics of cultivated plants. A flexible hierarchical system based on grouping of cultivars is proposed as a practical alternative.—[Author's summary]

Latif, S. M., 1967, *Perusasteraan Biologi Nomenklatur Anggerik merangkap siklopedia penghimpun—pengihimpun dibidang botani umumrija, dibidang orchidologi chuchusnja, terutan dalam wilajah Asia Tenggard.* Pp. 179. Djakarta, Indonesia. A glossary of technical terms relating to the Orchidaceae of Malaysia, and also including information on the origins of the names of many of the genera of the family.—[D.H.K.]

Lawrence, W. J. C., 1967, Glossary of terms used in plant breeding, *Sci. Hort.*, **19,** 108-116.

Little, E. C. S., 1967, A name for the science of weed control, *PANS*, **13,** 179-183. Various suggested names are put forward for the science of weed control, and it is concluded that 'Tology' is the best word to describe this particular branch of science.—[D.H.K.]

Löve, A. & Kapoor, B. M., 1967, New combinations in Acetosa and Bucephalophora, *Taxon*, **16,** 519-522. A number of species and subspecies of *Rumex* are transferred to *Acetosa* Mill. and *Bucephalophora* Pau.—[D.H.K.]

LOVE, D., 1968, Nomenclatural notes on Mt. Washington plants, *Taxon*, **17**, 89. A number of new combinations are made, including the raising of *Epilobium angustifolium* L. var. *platyphyllum* Daniels (*E. angustifolium* L. subsp. *circumvagum* Mosquin) to specific rank as *E. danielsii* D. Löve, nom. nov.—[D.H.K.]

MCVAUGH, R. & BULLOCK, A. A., 1968, A proposal to treat orthographic variants as not validly published, *Taxon*, **17**, 55-57.

MOGGI, G. 1967, A proposito della nomenclatura botanica. Sulla corretta applicazione delle regole di nomerolatera nei lavori di floristica e sistematica, *Webbia*, **22**, 423-436. Notes on the correct application and use of botanical nomenclature in citing types, literary references, etc.—[D.H.K.]

NATHO, G., 1968, Bernerkungen zur Benennung der Bastarde, *Taxon*, **17**, 115-117. The naming of hybrids is insufficiently solved by the *International Code of Botanical Nomenclature*. Terrell (1963, *Taxon*, **12**, 105-108) proposed to use the signs $<$ and $>$ in naming the products of introgressive hybridization. When there are hybrids with three components the number of signs is high. It is now proposed to use the Greek letter Φ (symbol for a double arrow) in naming introgressive hybrids (e.g. *Betula pendula* Φ *Betula pubescens*; *B.* Φ *aschersoniana*). In the case of the dominance of one parent in the hybrid, this may be shown by an arrow (e.g. *B. pendula* ← *B. pubescens*, in the case of dominant *B. pendula*). —[Author's summary]

RAUSCHERT, S., 1968, Zur Frage der Gottungsnamen bei Fabricius, *Taxon*, **17**, 153-156. Fabricius' *Enumeracio methodica plantarum horti medici Helmstadiensis* of 1759 is essentially a list of names of species grown in the Helmstedt botanic garden. These names of species are often uninominal and should not be considered generic names.—[D.H.K.]

REVEAL, J. L. & SPEVAK, V. S., 1967, Publication dates and current names of 144 names proposed in two 1848 Thomas Nuttall articles, *Taxon*, **16**, 407-414. Nuttall's article entitled 'Descriptions of Plants collected by Mr. William Gambel in the Rocky Mountains and Upper California' was first published in the *Proceedings of the Academy of Natural Sciences of Philadelphia* (volume 4) between 21 March and 4 April 1848. This article subsequently appeared also in the *Journal of the Academy of Natural Sciences of Philadelphia* (ser. 2, vol. 1) between 1 and 8 August 1848. Almost without exception current literature attributes the Nuttall names to the latter publication. A list of the 144 names proposed by Nuttall in both articles, with present nomenclatural alignments is appended.—[Authors' summary]

SOÓ, R., 1967, Species et combinationes novae florae Europae praecipue Hungariae, 6, *Acta bot. hung.*, **6**, 299-310. Many new combinations are made, and new varieties and forms described in preparation for future volumes of the author's *Flora of Hungary*. The name **Cruciata ciliata** Opiz, (in Presl, *Fl. Czech.*, 1819, 24) predates the name *C. laevipes* Opiz (1852).—[D.H.K.]

SPRAGUE, M. L., 1967, How plants were and are named, then and now, 370 BC.—1966 AD., *Proc. Cotteswold Nat. Fld Club*, **35**, 39-41.

ZABINKOVA, N., 1968, Generic names ending in -is and the determination of their stems, *Taxon*, **17**, 19-33. The determination of the stem of generic names ending in *-is* is a special task for each particular case. In the future it is preferable to avoid such names, unless quite obvious, *viz.* names having a second (final) part of either Greek or Latin origin ending in *-is*, or a Greek stem, with the widespread Greek element *-itis* (itidis), *-yllis* (ellidis) and so on.

For existing names one should be guided by the following criteria:

1. The grammatical form of the ancient word (Latin or Greek).
2. The existing tradition (which in most cases does not contradict 1).
3. The formation of the stem by analogy.—[Author's summary]

MISCELLANEOUS

Agricultural Research Council London, 1967, *The Effects of Air Pollution on Plants and Soil.* Pp. iii + 53. H.M.S.O. London. Price 6/-. A survey of the effects of various types of atmospheric pollution, e.g. deposited matter from smoke and smog, sulphur dioxide, fluorides and lead on plant life. An exhaustive bibliography is appended.—[D.H.K.]

Bennet-Clark, T. A., 1967, The role of plant sciences in a modern world, *Adv. Sci.*, **24**, 65-73.

Berger-Landefelt, U., 1967, Der Energieumsatzam Standort, *Bot. Jb.*, **86**, 402-448.

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Bournerias, M., 1967, Hypericum helodes et Carex goodenoughii sur la platière des Couleuvreux, *Bull. Ass. Nat. Loing*, **43**, 86. Notes on the occurrence of *Hypericum elodes* and *Carex nigra* in the Fontainebleau region.—[E.B.B.]

Brummitt, R. K. & Ferguson, I. K. (Compilers), 1968, Index to European taxonomic literature for 1966, *Regn. Veg.*, **53**. Pp. 245. A most valuable account of literature on European vascular plants which was published in 1966. The work is arranged alphabetically under families and genera, particular attention being drawn to new taxa described, and new combinations made, during the year. The list of periodicals with appropriate abbreviations from which the references were obtained is also extremely useful.—[D.H.K.]

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Dostal, R., 1967, *On Integration in Plants.* Translated into English by J. M. Kiely. Pp. xvii + 218. Harvard University Press, Cambridge, Mass., U.S.A. Price 57/-.

Everett, J. L., Day, C. L. & Reynolds, D., 1967, Comparative survey of lead at selected sites in the British Isles in relation to air pollution, *Food & Cosm. Tox.*, **5,** 29-35.

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Fogg, G. E., 1968, Food, living space and the future, *J. Roy. Soc. Arts.*, **1968,** 287-297.

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Francis, P. F. & Southcott, R. V., 1967, Plants harmful to man in Australia, *Misc. Bull. Bot. Gard. Adelaide*, **1.** Pp. 53. Descriptions, illustrations, clinical effects, etc., are provided for many poisonous plant species, mainly natives of Australia; introduced species in the account include: *Arum italicum*, *Cannabis sativa*, *Convallaria majalis*, *Digitalis purpurea*, *Euonymus europaeus*, *Euphorbia peplus*, *Hedera helix*, *Laburnum anagyroides*, *Ligustrum vulgare*, *L. ovalifolium*, *Papaver somniferum*, *Prunus laurocerasus*, *Atropa belladonna*, *Datura stramonium*, *Hyoscyamus niger*, *Solanum nigrum*, *Chrysanthemum vulgare*, *Taxus baccata*, etc. —[D.H.K.]

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Gilbert, J. L., 1967, Britain's endemic flowering plants, *Gdnrs' Chron.*, **162** (19), 16-18. Notes on a number of taxa which are believed to be endemic to the British Isles. These include *Rhynchosinapis monensis*, *Ulmus plotii*, *U. coritana*, *Arabis brownii*, *Calamagrostis scotica*, *Mentha scotica*, *Primula scotica*, *Cerastium nigrescens*, *Aconitum anglicum*, *Narcissus obvallaris*, *Saxifraga hartii*, *Allium babingtonii*, *Fumaria occidentalis*, *F. purpurea*, *Myosotis brevifolia*, *Cochlearia scotica*, *Alchemilla minima*, *Limonium paradoxum*, *L. recurvum* and *L. transwallianum*. The author does, however, point out that a number of them have been reduced to subspecies and varieties of species which occur in continental Europe and elsewhere. Mention is made also of endemic species of *Euphrasia*, *Hieracium* and *Taraxacum.*—[D.H.K.]

GRANT, W. F., 1967, Cytogenic factors associated with the evolution of weeds, *Taxon*, **16**, 283-293. From a survey of the literature concerning the reproductive behaviour and the cytogenetic mechanisms possessed by successful weeds, it is apparent that weeds are associated with diverse and in most cases flexible genetic systems. Successful weeds develop where a heterotic advantage may be fully utilized in conjunction with some means of effective dissemination. The role of hybridization, while not a criterion for weediness, may promote the necessary gene combinations in diploids, in polyploids and in apomicts which would provide the variability for adaptation to weediness for the favoured genotype. Occasional hybridization by inbreeders allows for the repatterning of genes and with their mode of reproduction which promotes rapid colonization of a superior genotype many inbreeders are successful weeds. Evidence is presented to show that herbicides used to control weeds are inadvertently changing the composition of the flora.—[Author's summary]

GRIME, J. P. & HUTCHINSON, T. C., 1967, The incidence of lime-chlorosis in the natural vegetation of England, *J. Ecol.*, **55**, 557-566. A study carried out in Derbyshire between 1958 and 1965 to estimate the frequency of lime-chlorosis in flowering plants.—[D.H.K.]

HANN, J., 1967, Barren desert stretches over the North-East, *Northern Echo*, 12 October 1967. A report of an interview with Mr Oliver Gilbert, of Newcastle University, who is carrying out a study of the effects of atmospheric pollution on plant life in north-east England. Particular emphasis is made of the decline of bryophytes and lichens which are particularly sensitive to the presence of sulphur dioxide; conifers too are badly affected in polluted areas. Mention is made of a low lying area, Jesmond Dene, near Newcastle, which still possesses an interesting bryophyte and lichen flora, and it is concluded that this is due to the shelter of trees, whose branches and leaves in the summer act as a 'web' trapping the sticky sulphur dioxide gas. Winter pollution levels in Jesmond Dene have been found to be considerably lower than in adjacent areas.—[D.H.K.]

HARDER, R., 1967, Kleine Versuche über die Antiseptica aus den Vordaungsorganen-einiger carnivorer Pflanzen, *Ber. dt. bot. Ges.*, **80**, 326-328.

HARLAN, J. R. & DEWET, J. M., 1966, Some thoughts about weeds, *Gard. J.* (*New York*), **16**, 189-193 & 196. Notes on the origin of the word weed, the various definitions of a weed and the categories of weeds.—[D.H.K.]

IVENS, G. W., 1967, *East African Weeds and their Control*. Pp. xiv + 244. Oxford University Press, Lusaka, Addis Ababa. Descriptions and figures are given of 100 common East African weeds, including a number of species which occur also in Britain, e.g. *Sonchus oleraceus*, *Hypochoeris glabra*, *Galinsoga parviflora*, *Silene gallica*, *Nicandra physolades*, *Galium spurium*, etc.—[D.H.K.]

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KERRICH, G. J., MEIKLE, R. D. & TEBBLE, N. (Editors), 1967, *Bibliography of Key Works for the Identification of the British Fauna and Flora. Systematics Association Publication No. 1*. Edition 3. Pp. vii + 186. London. Price 15/-. A new edition of this very useful volume with the section on botany greatly revised and enlarged by R. D. Meikle.—[D.H.K.]

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Lewis, H., 1967, The taxonomic significance of autopolyploidy, *Taxon*, **16,** 267-271.

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Löve, A., 1967, The evolutionary significance of disjunctions, *Taxon*, **16,** 324-333.

Matagne, R., 1967, Effets de l'acide oléique sur les cellules, la germanation et la croissance de diverses espèces végétales, *Bull. Soc. r. Bot. Belg.*, **100,** 23-39.

Mathe, I., Precsenyi, I. & Zóloyomi, B., 1967, Phytomass investigation in different ecosystems at Ujszentmargita, *Acta Bot. Acad. Sci. Hung.*, **13,** 239-257.

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Mellanby, K., 1967, *Pesticides and Pollution.* Pp. 221 + 14 plates. The New Naturalist. Collins, London. Price 30/-. Although mainly devoted to the effects of pesticides, insecticides, atmospheric, water and radiation pollution on mammals, the book contains a few references to plants.—[D.H.K.]

Merxmuller, H., 1968, Chemotaxonomie?, *Ber. dt. bot. Ges.*, **80,** 608-620.

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Rickett, H. W., 1966, How to write a book about wild flowers, *Gard. J.* (*New York*), **16,** 201-202.

Santa, S., 1967, Identification hivernale des plantes ligneuses de la Flore de France, 1. Plantes à feuillage cadue, *Naturalia monspel., sér. Bot.*, **18,** 3-192. A key is given to the identification of nearly 400 trees and shrubs found in France while in a leafless stage. Illustrations of twigs and buds are also provided.—[D.H.K.]

Smith, E. C. Bate-, 1968, The phenolic constituents of plants and their taxonomic significance, 2. Monocotyledons, *J. Linn. Soc. Bot.*, **60,** 325-356.

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TUOMIKOSKI, R., 1967, Notes on some principles of phylogenetic systematics, *Ann. Ent. Fenn.*, **33,** 137-147.

ULEHLOVA, B., 1967, Microflora in the soils of temporarily flooded meadows, *Preslia*, **39,** 293-305.

VILLION, P., 1968, Prolongation exceptionelle de floraison en novembre 1967, *Monde des Plantes*, **63** (359), 8. Notes on an exceptional number of species seen in flower near Bayeaux on the 12 and 19 November 1967; of particular interest are *Centranthus ruber*, *Geranium robertianum*, *Poa pratensis* and *Ranunculus bulbosus*. —[D.H.K.]

OBITUARIES

JOHN EZRA WOODHEAD, B.Sc., F.R.I.C., F.P.S.
(1883-1967)

John Ezra Woodhead died on 22nd September, 1967 at the age of 84 after a lengthy period of declining health. He will be sadly missed by many friends and especially those interested in *Rubi* or associated with the South London Botanical Institute.

Woodhead was born at Wyke in Yorkshire on 3rd April, 1883 and educated at Bradford Grammar School and Bradford Municipal Technical College. It is significant that botany, with inorganic chemistry, was the subject of his first examination success in 1901. He was registered as a chemist and druggist in 1904, and became a member of the Pharmaceutical Society in 1905. It was not until 1922 that he obtained his B.Sc. (London), followed in 1926 by Fellowship of the Institute of Chemistry. He acquired an outstanding knowledge of drugs, and this was one of the pharmaceutical subjects on which he lectured at Chelsea Polytechnic for over 20 years, and lead to his becoming in 1939 a partner in Muter & Hackman, a leading firm of public analysts.

Like many other pharmacists (George Claridge Druce and James Walter White are well known examples) his interest in botany as a hobby grew from his profession. Weekend excursions round London, sometimes with organised parties, and summer holidays farther afield, were spent in search of plants. For many years he made regular visits to Switzerland, where the flora round the higher alpine villages was often at its best at the end of July when he was free from lecturing responsibilities. At home, at this stage, he was mainly concerned with seeing as many British plants as possible and he was my companion on various trips to Scotland, northern England, etc. On these, his wide knowledge and interest in all aspects of natural history and architecture added greatly to the enjoyment.

The outbreak of war in 1939 brought some of Woodhead's lecturing activities to a hall and enabled him to catch up on arrears of botanical work. At last he had time to take botany more seriously and to attempt critical groups. This led him to collecting *Rubi*, so well represented round London, and to a friendship with W. C. R. Watson and C. Avery. Woodhead took these elderly batologists in his car to the bushes they had studied over many years—including bushes which were types for new species described by Watson. Later on, Woodhead was able to pass on some of this information to younger men, and especially to Mr Beverley Miles. His interest in other groups became very much less, but he joined D. McClintock, the late Rex Graham, and myself in a trip to the Highlands in 1949.

Woodhead's greatest contribution to British botany arose from the death of W. C. R. Watson in 1954, when he acted as botanical executor. Watson had completed the manuscript of his *Handbook of the Rubi of Great Britain and Ireland*, but no type had been set up. Woodhead assisted P. D. Sell to see it through the press and the work appeared in 1958 with their joint foreword. Woodhead was then faced with a complicated task in disposing of Watson's *Rubus* specimens, since holotypes of only some of his new taxa had been deposited at the British Museum (Natural History). The first task was to extract with the help of P. D. Sell holotypes of the taxa published posthumously in *Watsonia* in 1956 and these were given to the British Museum. Woodhead then selected a complete set of Watson's species of the *Handbook* for the South London Botanical Institute, and a nearly complete set for Kew. After setting aside some sheets for his own use, and about 200 for E. S. Edees, the remaining British material (which was considerable) was given to Cambridge and all the foreign material to the Institute. Mr Beverley Miles, to whom I am indebted for much of this information, tells me that when lectotypes for further taxa have been selected there will still be, in spite of all Woodhead's work, types of Watson's taxa spread over all the herbaria mentioned.

Dealing with this great quantity of critical herbarium material, relating it to Watson's manuscripts, and getting the Institute's large collection of brambles mounted and arranged, was an enormous task. It occupied much of Woodhead's time for the next twelve years and was completed only a few weeks before his death.

The other connection in which Woodhead will be especially remembered is his work for the South London Botanical Institute, which he supported for some 45 years. He was one of the few members available to maintain the activities of the Institute during the war, and this work was acknowledged by his election as Fellow in 1949. On the death of W. R. Sherrin in 1955 he was elected Honorary Secretary, and held this office until 1962, when he felt that he must give way to a younger man. From time to time he made generous gifts to the Institute which included the setting up of a substantial Endowment Fund on the occasion of the Institute's Jubilee celebrations in 1962.

I knew Woodhead from my boyhood and for the last twenty years we were close friends, and yet he was not an easy man to understand. A Yorkshireman to the backbone, he was blunt and down to grass roots in his approach, and highly critical of the slightest waste, or laxity in spending, or failure of others to work as hard as he had done. His quiet retiring nature tended to obscure his wide learning and great capabilities so that he was seldom conspicuous at meetings. When he was moved to speak at Committee meetings, it was usually to inject a bit of sound Yorkshire commonsense into a discussion that had lost sight of practical considerations. At heart he was the kindest of men who avoided publicity for his many generous acts. His avoidance of publicity may explain why his only noteworthy botanical writings were excellent obituaries of Watson and Avery (*Proc. bot. Soc. Br. Isl.*, **1**, 556-561, (1955) & **4**, 351, (1961)).

Woodhead leaves two herbaria, one general, the other of *Rubi*, both mounted on small sheets. The *Rubi* have been given by his widow to Cambridge and the other specimens to the University of Lancaster. On the death of his first wife in 1964 he married Mrs M. E. E. Sherrin, who survives him. He was buried on 28th September, 1967 at West Norwood Cemetery.—J. E. Lousley.

GORDON MARK LEO HASKELL

Gordon M. L. Haskell (1920-1967) who died in June 1967 had been a member of the Society for ten years. Born in London in 1920 he became after leaving school a technical assistant in the Genetics Department of the John Innes Horticultural Institution which he subsequently left to pursue a degree course at Chelsea Polytechnic. After a period of research in America he returned to take up an appointment as a geneticist at the John Innes Institution in 1948. Much of his work here was concerned with the cytology and taxonomy of *Rubus* and he read an interesting paper on this at a Regional Meeting at Birmingham in 1957, when he admitted that notwithstanding his researches he could offer no solution of the problem of the evolution of brambles. In 1960 he contributed a paper on 'The Raspberry wild in Britain' to *Watsonia*, **4**, 238-255. Five years later he read a paper at a Conference of the Society, also at Birmingham, on the history, taxonomy and breeding system of apomictic British *Rubi* (see Hawkes, J. G. (1966), *Reproductive Biology and Taxonomy of Vascular Plants*) in which he outlined work still needing to be done. In the meantime he had become in 1958 the head of the Genetics Department of the Scottish Horticultural Research Institute which he left in 1965 to become head of the Department of Biological Science at Portsmouth College of Technology. In 1962 he received the degree of D.Sc. of London University for his published work—he had written numerous papers on plant breeding and genetics but few of them were concerned with the wild plants of Britain.

—J. G. Dony.

REPORTS

REPORT OF THE COUNCIL FOR 1967

This report and the audited accounts relate to the calendar year 1967. Figures in brackets are those for 1966.

During the year 108 (122) new members joined the Society and we lost 90 (98) by reason of death, resignation and the operation of Rule 28. The total membership at the end of the year was 1,694 (1,676), representing a net gain of 18 (24). Although the growth of the Society thus continues, attention must be drawn to the fact that the annual rate of increase has been continuously declining now for four years. Unless this trend is reversed, the membership will shortly show an actual fall for the first time in the post-war period.

The accounts of the Society for the past year are appended. For several years members have been reminded that expenses were rising, and this tendency was particularly noticeable in 1967. Excluding the cost of printing our journals (on which we have again incurred less than the full cost of two parts each of *Watsonia* and *Proceedings*), total outgoings have increased, compared with the previous year, by more than £500, spread over almost every item. The cost of printing the programme of Field Meetings in a different format proved more expensive, while general printing included the cost of a new Prospectus, as well as reprints of the Rules, of lists of the Panel of Referees and of the Regional Organisation. During the latter part of the year the Society began to make use of the services of the Institute of Biology for certain secretarial purposes and the cost of this, which will be considerably greater in the coming year, has added to our outgoings.

Whilst the year has ended with a surplus of income over expenditure, this is entirely due to the savings caused by not maintaining our full programme in publishing our journals, and once we catch up in this respect we must anticipate a deficit on our Income and Expenditure Account. Members are therefore again asked to do all they can to encourage their botanically-minded friends to become members of the Society. It is clear that unless the increase in our membership can be greater than it has been during the more recent years, it will soon be necessary for the annual subscription to be raised.

The only expenditure out of Publications Fund has been certain pre-publication expenses in connection with 'British Sedges', which it is expected will be published in April 1968 (receipts from pre-publication orders began to be received in January 1968). A first payment was received in respect of royalties on Conference Report Number 9. As it is clear that by utilising the services of professional publishers, Conference Reports have a wider distribution than can be achieved by the Society alone, arrangements have now been made for Conference Report Number 10 to be published on behalf of the Society by Academic Press. By this means the Society is relieved of all costs of printing and distributing and can hope to receive, in due course, modest sums by way of royalties.

THE MEETINGS COMMITTEE had an extremely active year. In February, in conjunction with the Pharmaceutical Society of Great Britain, it arranged an evening meeting in London on the historical connections between botany and pharmacy. Despite the rather short notice given 67 persons attended and the innovation was judged a success. In April the Annual General Meeting was held at Monks Wood Experimental Station, out in Huntingdonshire, by kind permission of the Director. The programme included a series of lectures on the theme of trees and woodlands, a tour of the Biological Records Centre and an excursion on the Sunday to Woodwalton Fen. Ninety (80) members and friends attended. The Committee also organised, as usual, the Annual Exhibition Meeting in November, held once again in the Department of Botany, British Museum (Natural History), by kind permission of the Keeper. Fifty-one (36) exhibits were staged, a most encouraging increase, and over 200 members and friends signed the attendance register. About 75 (70) were later present at the Reception held in the Conversazione Room. The number of field meetings in England was deliberately reduced this year as an experiment, only two being held: to Stour Wood and Wrabness, Essex, and to the Lune Valley, Lancs. The Welsh Regional Committee organised field meetings at Llandudno, Caern.; Llanbedr, Merioneth; Dulais Valley, Mont.; and at three different places in Carmarthenshire. The Welsh Autumn Meeting took place at Swansea, where the programme included lectures, an excursion and the judging of the Region's photographic competition. The Irish Regional Committee organised a week-long meeting in Connemara, while its autumn exhibition meeting was held this year in the North, in Belfast. Another Regional Meeting in the autumn, for the North East, was arranged at York, where a number of lectures were given and an excursion made to Askham Bog. The outstanding event of the year, however, was the Conference on 'Modern Methods in Taxonomy' held at Liverpool University in September in association with the Linnean Society of London. Without doubt this was the most impressive occasion for which the B.S.B.I. has ever been responsible, distinguished above all by the large number who attended from overseas, and the Society is much indebted to Professor V. H. Heywood and Dr C. D. K. Cook for all the hard work they put into this to make it such an enjoyable and successful event. In all 179 members and guests attended. A full programme for 1968 has also been planned, including, for the first time, a Presidential Address.

THE JUNIOR ACTIVITIES COMMITTEE enjoyed a revival during the year after a period of being without a Secretary. The Society is fortunate in having found Miss Ailsa Burns to fill this vacant post. The membership has been partly reconstituted and the decision taken to concentrate for the time being on organising field meetings, for which purpose the Committee will meet just once a year. In view of this more limited function it was considered more appropriate for it to become a sub-committee of the Meetings Committee, on which from now on its Secretary will automatically sit. Only two field meetings were arranged during the year: a day on Goss Moor, Cornwall, and a week in the Chilterns. A more extensive programme, including a meeting in the Alps, is planned for 1968.

THE DEVELOPMENT AND RULES COMMITTEE has had a somewhat quieter year than lately, but has continued to receive and consider a steady flow of suggestions for new developments. These have ranged from the adoption of postal voting for Council election to the choice of a new letterhead. A sub-committee has produced a revised version of the Society's Prospectus, while another has concluded two years' detailed planning of a programme of 'network research', which it is hoped to launch early in 1968.

THE PUBLICATIONS COMMITTEE has been responsible for the production during the year of one part of *Watsonia* and two parts of *Proceedings*, the second of the latter being brought out in a completely new format, which has been very well received. The Committee also helped to prepare for publication *British Sedges*, by A. C. Jermy and T. G. Tutin, and the *Index to Botanical Monographs*, by D. H. Kent.

THE CONSERVATION COMMITTEE has continued its active investigation of threats to the British Flora. Two of this year's crop were a new road across Kenfig Dunes and reservoir developments in Montgomeryshire. The Committee also gave special attention to the matter of transplants and deliberate introductions. One liaison meeting with the Nature Conservancy took place during the year.

THE RECORDS COMMITTEE, in its first year in its new form (a result of the merging of the Local Floras and Maps Committees), carried out revisions of the lists of the Society's Recorders, Referees and Specialists; it also gave close attention—and, so far as it could, advice—to a number of local Flora projects. Another major activity was a critical overhaul of the Society's present system of collecting and publishing plant records. Requests for card-index drawers and cards, to be supplied by the Society, were received from 46 Recorders in respect of 71 vice counties in all; to help meet the cost of these, the Committee has applied to the Carnegie Trust for a grant.

THE COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA arranged its customary full and varied programme of field meetings, which this year totalled sixteen, several of these being joint meetings with local societies. It also arranged a very successful excursion to the Pyrenees, in which several English and Irish members also took part. The Annual Exhibition Meeting was held at the Royal Botanic Garden, Edinburgh, by kind permission of the Regius Keeper.

The Council thanks the many friends of the Society who have helped in various ways to further its progress and also all those members who have taken an active part in organising its affairs on committees, as representatives on other bodies and in other ways. In particular, thanks must be expressed to the authorities of the University of Liverpool, for allowing the Conference to be held there; of University College, London, the Nature Conservancy, the Linnean Society of London and the City of Perth Museum and Art Gallery, for allowing the use of their premises for committee meetings; of the Royal Botanic Garden, Edinburgh; University College of Wales, Swansea; and Queen's University, Belfast, for allowing Regional Meetings to take place there; and to the Trustees of the British Museum (Natural History), for the use of their Lecture Hall and Conversazione Room in connection with the Annual Exhibition Meeting. Finally we thank our Honorary Auditors, Messrs. Price, Waterhouse & Co., for their continued services.

J. G. DONY, *President.*
D. E. ALLEN, *Hon. General Secretary.*

6th March, 1968.

GENERAL INCOME AND EXPENDITURE ACCOUNT

for the year ended 31st December, 1967

1966			
	Cost of Printing and Distributing: ...		
	Proceedings, Vol. VI, Part 4 (balance), Vol. VII, Part 1 and provision for Part 2 ...	£1,579 13 9	
£1,846	*Watsonia*, Provision for Vol. VI, Part 6, less over-provision for Part 5	532 9 10	£2,112 3 7
193	Printing and Distributing Annual Report and Notices of Field and Indoor Meetings		274 8 0
33	Expenses of Council and Committee Meetings		35 4 11
40	Travelling Expenses of Officers, Secretaries and members attending Meetings		99 14 1
178	General printing, stationery, postages, telephone and petty expenses		443 8 2
16	Expenses of Regional Organisation, including Card Indexes for Recorders		136 12 3
19	Field and Indoor Meetings, expenses less fees received ...		29 7 11
—	Contribution to Wild Plant Protection Working Party ...		20 0 0
865	Excess of income over expenditure credited to General Fund ...		154 17 0
£3,190			£3,305 15 11

1966			
£2,352	Subscriptions received		£2,371 12 11
399	Interest received		426 9 5
	Proceeds from Sales:		
	Proceedings ...	£152 12 5	
	Watsonia	315 1 2	
439	Old B.E.C. Reports	40 0 0	507 13 7
£3,190			£3,305 15 11

PUBLICATIONS FUND

Transactions in 1967

1966			
—	Payments to artists and other pre-publication expenses re *British Sedges*		£222 17 3
—	Printing price-list of publications...		8 10 0
£6	Preparation of Index for Conference Report No. 9		—
	Balance to 1968:		
	General	£1,718 19 4	
3,415	Atlas Royalties less outgoings ...	1,718 1 0	3,437 0 4
£3,421			£3,668 7 7

1966			
£3,279	Balance from 1966 Sales:		£3,414 14 9
45	Conference Reports	£127 16 2	
13	Other Publications ...	14 2 0	141 18 2
	Royalties received:		
84	*Atlas of the British Flora*	94 18 6	
	Conference Report No. 9	16 16 2	111 14 8
£3,421			£3,668 7 7

BALANCE SHEET AS AT 31st DECEMBER 1967

1966			
	General Fund:		
	Balance 1st January 1967 ...	£4,058 6 10	
	Add: Premium on conversion of Defence Bonds...	25 0 0	
	Excess of income over expenditure for year... ...	154 17 0	£4,238 3 10
£3,415	Publications Fund		3,437 0 4
40	Benevolent Fund		39 11 0
1,049	Creditors for Printing and General Expenses		2,409 2 0
95	Subscriptions Received in Advance		107 15 0
£8,657			£10,231 12 2

1966			
	Investments:		
	4½% Defence Bonds	£500 0 0	
	5% Defence Bonds	3,000 0 0	
	5% National Development Bonds	1,000 0 0	
£5,000	5½% National Development Bonds	500 0 0	£5,000 0 0
	Cash at Bank:		
	Deposit Account...	4,500 0 0	
3,657	Current Account ...	731 12 2	5,231 12 2
£8,657			£10,231 12 2

J. C. GARDINER,
Hon. Treasurer.

Audited and found correct.
6th March, 1968.

Price, Waterhouse & Co.,
Hon. Auditors.

TEESDALE DEFENCE COMMITTEE

REPORT AND ACCOUNTS

In May last a letter was sent to all subscribers to the Teesdale Defence Fund telling them of the final outcome of the long-drawn-out battle in defence of the Cow Green site in Upper Teesdale. They were reminded that, although it had not been possible to stop the construction of the reservoir, valuable concessions had been obtained and that the publicity given to the issue had been such that it was anticipated that, in future, 'second thoughts' would be given by promoters of projects of this kind before they sought to put their plans into action.

A statement of the Account of the Fund is set out below. It had been hoped that by now the Fund could have been closed and any remaining balance handed over to the Northumberland and Durham Naturalists' Trust for conservation work in Upper Teesdale, in accordance with the stated intentions of the Committee. This, however, has been delayed by the contentions of the Inland Revenue and the Charity Commissioners that the Fund cannot be accorded charitable status so that, inter alia, Income Tax must be paid on any bank or other interest received by the Fund. This argument appears to rest on the fact that the defence of the area necessitated opposing a Bill in the Houses of Parliament and the contention that to oppose legislation is a political purpose which cannot be charitable. It is felt that the issue involved is of importance to the conservation movement as a whole and it has, therefore, been decided that the opinion of learned counsel should be sought; if his advice is favourable, then further efforts should be made to persuade the Inland Revenue and the Charity Commissioners to reverse their views.

For the time being, therefore, the balance of the Fund is being retained, but it is hoped that it will not be long before it can be finally wound up.

J. C. GARDINER, *Hon. Treasurer.*

TEESDALE DEFENCE FUND

Summary of Receipts and Payments (to 31st December 1967)

Donations	£22,917 18 11	Legal and Parliamentary Agents' Fees and Disbursements	£11,173 4 0
Bank Deposit Interest	563 14 3	Expert Witnesses' Fees and Disbursements	6,754 17 6
		Printing and Dispatching Appeal Brochures and Circulars, Reply Postages and Acknowledgements	2,510 1 10
		Publicity	208 19 5
		Travelling Expenses	361 14 9
		Clerical Assistance	217 16 6
		Printing, Stationery, Telephones, Postages and Miscellaneous Expenses ...	401 4 2
			21,627 18 2
		Balance, subject to outstanding expenses, to be paid over to the Northumberland and Durham Naturalists' Trust for conservation work in Upper Teesdale	1,853 15 0
	£23,481 13 2		£23,481 13 2

In our opinion the above summary gives a true and fair view of the receipts and payments of the Teesdale Defence Fund for the period from 21st August 1965 to 21st December 1967.

Price, Waterhouse & Co.,
Chartered Accountants,
Honorary Auditors.

6th March, 1968

COMMITTEE FOR THE STUDY OF THE SCOTTISH FLORA:

THIRTEENTH ANNUAL REPORT TO 31ST DECEMBER 1967

The Committee met twice, each time in Perth, and an Exhibition meeting was held on Saturday, 11th November, at the Royal Botanic Garden, Edinburgh, by kind permission of the Regius Keeper.

Fifteen field meetings were held: fourteen were held in Scotland—Stranraer, 3rd and 4th June; Carriber Glen and Aberlady Bay, 10th and 11th June; Gordon Moss, 17th–18th June; Beinn Heasgarnich, 18th June; Isle of Coll 21st-28th June; Dumbarnie Links, 24th June; Hawick, 24th and 25th June; Tomintoul and Ben Avon, 24th-26th June; Peeblesshire, 29th July; Threipmuir Common, 5th August; Perth, 5th-7th August; Somewhere in Argyll, 12th and 13th August; Ferry Hills and Tynninghame, 19th and 20th August, and the Lammermuirs on 2nd September. A continental meeting to The Pyrenees was held from 8th to 22nd July. Most of the meetings were very well attended.

The exhibition meeting was attended by about fifty people. Mr Davidian of the Royal Botanic Garden, Edinburgh, gave a most interesting talk on 'The Genus *Rhododendron*'.

The following exhibits were shown:—

Sublittoral algae of the West of Scotland	E. Conway
Some Uncommon Seaweeds found in Scotland	,,
Six Plants from a carrot field in Angus (the carrot seed came from Spalding, Lincs.)	Miss U. K. Duncan
Isle of Coll—C.S.S.F. Field Meeting 1967	,,
Senecio × *ostenfeldii* Druce (*S. aquaticus* × *jacobaea*) from East Scotland, along with *Senecio aquaticus* and *S. jacobea*	,,
Examples of some early or first gatherings of Scottish Plants by Mr I. C. Hedge	I. C. Hedge
Herbarium specimens (a) *Aster schreberi* (2 sheets) (b) *Philosella flagellaris* subsp. *flagellaris* (1 sheet) subsp. *bicapitata* (2 sheets) (c) *Bamboos* *Arundinacea japonica* (1 sheet), *A. disticha* (1 sheet), *A. falconeri* (1 sheet), *Sasa palmata* (1 sheet) (d) *Geraniums* *G. ibericum* (1 sheet), *G. platypetalum* (1 sheet), *G.* × *magnificum* (*G. ibericum* × *platypetalum* (1 sheet), *G. ibericum* subsp. *jubatum*	D. McClintock
Additions to the Census List of Wool Aliens from Galashiels V.C. 79 (Selkirk) 1967 *Atriplex suberecta* Verdoorn—Introduced with wool, Galashiels 1966 *Lasiochloa echinata* *Ehrhoorta longiflora*	Miss M. McCallum Webster
'Inchrory Marl' or 'Tufa' showing leaf fossils—Collected on the Tomintoul Field Meeting 1967	

Plants of Arran	Mrs. A. H. Sommerville
Plants from the Pyrenees	A. Wegener
Herbarium of British Mosses collected by Thomas Lyle, Scottish poet (1792-1859)	Miss M. A. MacAree

During the evening slides were shown as follows:

The Pyrenees	B. W. Ribbons
Rhododendrons	Miss E. Logan-Home
A theme—the hymn 'All things bright and beautiful'	Miss M. MacCallum Webster
Austria	Mrs A. H. Sommerville
Alan Soutar's slides of The Pyrenees	R. Mackechnie
The Pyrenees	A. McG. Stirling
Scenery, Geology and Flora of Jura	J. Grant Roger

There have been two changes in the composition of the Committee. Miss A. Deans has been appointed by the B.S.E. to fill the vacancy created by Dr Denis Ratcliffe's resignation. Mr G. Smith has resigned because of his appointment to a post in Malaya.

Two field meetings each of a week's duration, three weekends, and five day meetings have been arranged for 1968.

It is a pleasure to express thanks to the officers of the B.S.B.I. and B.S.E. and to all those who have generously given of their free time to help the Committee to carry out its activities.—E. P. Beattie.

NORTH-EAST REGIONAL MEETING, YORK, 1967

Thirty members attended the N.E. Regional Meeting in York on Saturday, 7th October, 1967. The morning session was held at St William's College, by kind permission of the Dean and Chapter, under the Chairmanship of Dr F. H. Perring.

Dr G. A. Nelson, of the School of Medicine, University of Leeds gave an illuminating paper on the problematical *Symphytum* spp. in Britain, in which he described nine species and hybrids illustrating these with coloured slides. He also showed how every species could be identified using the chromatography method frequently used by pharmacognosists. Dr Nelson demonstrated a number of specimens and answered many questions on specific habitats during the following discussion. Dr M. Sheila Gosden and Dr D. D. Bartley from the Departments of Education and Botany, respectively, at the University of Leeds, who are carrying out an investigation of the peat of Askham Bog, gave papers on The History of the Bog since the last Ice Age, and the present vegetation of the area. Diagrams of the different types of peat present, and of past tree species percentages based on total tree pollen were shown, and Dr Gosden described the methods used in pollen analysis. Dr Bartley showed colour slides taken by Miss Day of the various habitats of the Reserve, and of her experiments on the regeneration of *Osmunda regalis*. These last papers formed a most useful introduction to the Field Meeting.

At the Regional Meeting Miss C. M. Rob was elected as Representative to Council for the North-East Region.

In the afternoon a field meeting to Askham Bog was led by Dr W. A. Sledge of the Department of Botany, University of Leeds. Dr Sledge showed the party round this interesting Yorkshire Naturalists' Trust Reserve and plants seen included *Osmunda regalis*, some of which were at least 8 feet high and of very large girth, and *Carex elongata* growing with vegetative clumps of *C. elata* and *C. appropinquata*.

—Mrs M. Briggs.

EXHIBITION MEETING, 1967

An Exhibition Meeting was held at the Department of Botany, British Museum (Natural History), London, S.W.7, on Saturday 25th November 1967 from 2 p.m. to 5.30 p.m. About 250 members and guests attended.

Neotinea intacta IN THE ISLE OF MAN

See *Proc. bot. Soc. Br. Isl.*, **7**, 165-168 (1968).—D. E. ALLEN.

SYNTHESISED *Juncus bulbosus* × *kochii*

There have long been differing views on the taxonomic rank of *Juncus kochii* F. W. Schultz. Thus in recent years it has been treated as a full species in the *Flora of the British Isles* and included in *J. bulbosus* L. in the *List of British Vascular Plants*.

To obtain some facts about the relationship of these plants, crossings were made using *J. bulbosus* as female and *J. kochii* as male parent. Seedlings were successfully raised and were morphologically intermediate between the parents, with a variable number of stamens (3-6). They produced normal pollen grains, capsules and seed.

This fertility might suggest that *J. bulbosus* and *J. kochii* are indeed not specifically distinct. Yet they seem taxonomically, if not genetically, satisfactory as species as (1) they are separated by characters of 'specific' degree, (2) they are readily recognisable over a large area of Europe, (3) they apparently seldom hybridise where they grow together in the wild, and (4) they differ somewhat in their ecology and distribution.

The two taxa are best distinguished by the following characters:

> *J. bulbosus.* Perianth green, becoming pale pinkish-brown. Capsule narrow-oblong, obtuse or sub-acute, bluntly trigonous above, coloured like the perianth and equalling, less often exceeding it. Stamens 3, rarely 6. The commoner of the two in lowland England.
>
> *J. kochii.* Perianth blackish-brown except in shade. Capsule obovate to broadly oblong, ± retuse, sharply trigonous above, pale-green often flushed with blackish-brown, exceeding the perianth. Stamens 6. The commoner of the two in the mountainous districts of the north and west.

Specimens of these taxa and the synthesised hybrid were exhibited. The exhibitors would be interested to see wild plants thought to be *J. bulbosus* × *kochii*.

—P. M. BENOIT & D. E. ALLEN.

THE ENGLISH BOX (*Buxus sempervirens*) AND ITS FORMS

Live specimens of various cultivated forms of Box.

—TH. P. BEYNES & C. R. LANCASTER.

PERSONALITIES AT THE LIVERPOOL CONFERENCE

Photographs of various persons attending the Conference (10th-12th September 1967).

—T. BOULOS.

FLORA OF BERKSHIRE

Specimen maps, etc. from Flora subsequently published in May 1968.

—H. J. M. BOWEN.

Centaurium portense IN IRELAND

Centaurium portense (Brot.) Butcher is a rare species with an Atlantic distribution, known in Britain from sea cliffs in Cornwall, North Devon and Pembrokeshire. In 1966 this plant was found growing in a lawn at Killarney, Kerry, and while it may be introduced here, it seems quite likely that it may occur in more natural habitats on the coast of West Ireland.—H. J. M. Bowen.

Spartina pectinata LINK IN IRELAND

The exhibit illustrated the nature of the North American grass *Spartina pectinata* Link which has become naturalised on damp, peaty soil in a currently uncultivated part of the grounds of Costelloe Lodge, 20 miles west from Galway City (v.c. H. 16). It has formed an oval clump 12 metres long by 6 metres wide, which was first observed in September 1967 by Miss E. Booth of Co. Wexford. Specimens of the grass were identified provisionally as *S. cynosuroides* (L.) Roth by Miss M. Scannell, National Museum, Dublin, for exhibition at the B.S.B.I. Irish Region, Autumn Meeting. Subsequent identification as *S. pectinata* Link by the writer was confirmed by Dr C. E. Hubbard of Kew.

The habit of Irish *S. pectinata* corresponds to accounts of the species by Hitchcock (1950) and Mobberly (1956) with the addition that leaf-blades have a midrib and upper blades frequently overtop the inflorescence. Costelloe plants seem sterile; mature florets contain withering ovaries and anthers and there is no indication of spread by seed. Neither Hitchcock nor Mobberly refers to fruits or seeds.

Evidence suggests that *S. pectinata* was introduced at Costelloe about 40 years ago and that the presence in the area of North American *Eriocaulon aquaticum* (Perring/ Walters, 1962) is co-incidental.

REFERENCES

Hitchcock, A. S. (1950). *Manual of the Grasses of the United States*, Ind. ed. Washington.
Mobberly, D. G. (1956). Taxonomy and Distribution of the Genus *Spartina*. *Iowa St. Coll. J. Sc.*, **30**, 471-574.
Perring, F. H. & Walters, S. M., ed. (1962). *Atlas of the British Flora*. Cambridge.

—Patricia J. Boyle.

MORE ABOUT MULL

Details of progress with the investigation of the botany of Mull (see *Proc. bot. Soc. Br. Isl.*, **7**, 72, 306-307 (1967, 1968)).—Departmen tof Botany, British Museum (Natural History).

STUDIES IN *Ranunculus acris* L. *sensu lato*

The *Ranunculus acris* complex has been examined within Europe to investigate the geographic variation.

Herbarium sheets and photographs were shown to illustrate the taxa recognised within the complex.

R. granatensis Boiss. and *R. strigulosus* Schur have a restricted distribution and are relatively uniform in appearance. *R. acris* L.*s.s.* occurs over most of Europe and is a very variable plant.

Maps were shown of the variational pattern as shown by leaf-shape and hair-types. *R. acris* subsp. *friesianus* (Jord.) Rouy & Fouc. does not form any part of the clinal variation pattern seen in the remainder of *R. acris* L.*s.s.* although its distribution is completely overlapped by that of subsp. *acris*. It is suggested that it must previously have been at least ecologically isolated from subsp. *acris*.

Examples of leaves were displayed to show the seasonal variation which occurs in leaf-shape. This variation has led in the past to much nomenclatural chaos, which has been especially prevalent in the classification of British material.—Miss S. M. Coles.

HYBRIDS OF *Dryopteris aemula*

Recent investigations into spore-coat (perispore) patterns, whilst studying the distribution of *Dryopteris assimilis* S. Walker, suggested that a plant collected by V.H.C. near Strome Ferry, Wester Ross, as an odd form of *D. assimilis*, may well be a hybrid between that species and *D. aemula* (Ait.) Kuntze. Stereoscan pictures of spores showing an intermediate pattern of perispore between the two species were shown to illustrate this. If this plant proves to be a hybrid it will appear that whatever causes the pattern of the perispore to be laid down, is controlled by the genetical inheritance from both parents.

Materials of the *D. assimilis/dilatata* complex sent to the British Museum by A.G.K. from Argyll, in 1967, suggested further hybridisation of *D. aemula* with *D. dilatata* (Hoffm.) A. Gray. A third hybrid exhibited was that collected on the British Museum Survey of the Isle of Mull by A. Eddy. On investigation of the plant and the site, at which were growing *D. aemula* and *D. abbreviata* (DC.) Newm., A.C.J. concluded this to be a hybrid between these species. Further notes on these hybrids will appear in the *British Fern Gazette* (**10** (1), (1968)). All the putative hybrids showed the *D. aemula* characters of (i) comarin (hay) smell, (ii) light yellow-green crispy frond, (iii) elongate, often fimbriate paleae on the stipe and rhachis and (iv) the purplish brown colouration of the lower part of the stipe.

—V. H. Corley, A. C. Jermy & A. G. Kenneth.

BOTANICAL PAINTINGS AND STAMP DESIGNS

Original paintings of British wild plants and designs submitted for the General Post Office's competition for the British Wild Flowers series of stamps.—Mrs B. Everard.

BRITAIN'S ENDEMIC FLOWERING PLANTS

A dozen of the generally accepted British endemic flowering plant species were shown comprising: *Rhynchosinapis monensis*, *R. wrightii*, *Fumaria occidentalis*, *F. purpurea*, *Ulmus plotii*, *U. coritana*, *Saxifraga hartii*, *Primula scotica*, *Narcissus obvallaris*, *Cochlearia scotica*, *Aconitum anglicum* and *Calamagrostis scotica*, together with a short note on the history of each. A comprehensive account of Britain's endemic flowering plant species by the exhibitor was published in *Gardener's Chronicle*, 8th November, 1967.—J. L. Gilbert.

Scrophularia peregrina IN BRITAIN

Scrophularia peregrina L., a native of Mediterranean Europe, was found in May, 1966, in a garden at Shapwick, Dorset, where it had been well established, but unrecognised, for at least six years.

Very little seems to be known about the species in Britain. The earliest record discovered, one for Timperley, Cheshire, appears in the *Report of the Botanical Exchange Club* for 1914, while in that for 1932 is another from Lewes, Sussex; this is also included, with one from Forest Farm, Mark Cross, in a list of Introductions in Wolley-Dod's *Flora of Sussex* (1937). It appears, though, that the species is now extinct at all these stations.

S. peregrina in Shapwick seems to be confined to this one site. Although in the course of gardening activities over a period of about seven years, an infinitely large number of seeds must have been deposited on the waste ground on the other side of the garden wall—seed production per plant is enormous and the potential rate of germination has been found to be almost 100%—not one plant grew there in either 1966 or 1967. Moreover, while during the time in which it was observed at Shapwick, it behaved entirely as a vernal annual, flowering from mid-May to mid-July and then dying, plants raised from seed set since April, 1967, were growing luxuriantly, and flowering and fruiting, apparently normally, in the open in Kent in November, although it is not known if the seeds produced then are fertile.

The exhibit comprised living material from Kent, herbarium species from Dorset and from various localities on the Continent, the latter to show the range of variation in form, and certain Continental Floras, including Sibthorp's *Flora Graeca* (1806-40), containing illustrations and/or descriptions of the species.

—Miss N. M. HAMILTON.

A *Puccinellia* NEW TO BRITAIN

The genus *Puccinellia* includes several complexes which on account of their structural variability, the presence of hybrids, and probably of apomicts, have proved difficult to classify. Two such groups are represented in the British Isles, one being the very polymorphic *Puccinellia maritima* (Huds.) Parl., and the other the group of closely related species sometimes united under *Puccinellia distans* (L.) Parl. It is to the latter complex that the grass forming the subject of this exhibit belongs.

In his studies of the Scandinavian flora, the Swedish botanist, O. R. Holmberg, recognised two species of this group in his area, one being the widespread *Puccinellia distans* (*sensu stricto*). To the other he applied the name *P. retroflexa* (Curt.) Holmb., based on a British grass, *Poa retroflexa* Curt. The latter is so beautifully illustrated and so well described in W. Curtis's *Flora Londinensis* (vol. **2**, fasc. 6, tab. 10, (1792-98)) that one is left in no doubt that it has to be treated as a synonym of *Puccinellia distans*, a procedure followed by British botanists in general. Fortunately another name, *Festuca capillaris* Liljebl., based on Swedish material, is available for the grass incorrectly referred by Holmberg to *Puccinellia retroflexa;* it was transferred to *Puccinellia capillaris* (Liljebl.) by Jansen in his account of the grasses for *Flora Neerlandica* (vol. **1**, Afl. 2, p. 69, (1951)).

This is the grass which was first recognised as new to the flora of northern Scotland by W. H. Beeby who named it *Glyceria distans* var. *prostrata.* During the past fifteen years it has been collected in numerous localities on the coasts of Fife, Moray, Caithness, and Sutherland, and on various islands in Orkney and Shetland. It appears to be widespread in northern regions extending from N.E. America (Greenland), Iceland, Faeroes, to northern Scandinavia, southwards to the Baltic coast and Holland. Although it grows near the sea, it flourishes best in a well-drained habitat, such as on cliffs, walls, rock-crevices, among stones and on sandy soil among rocks by the sea.

Puccinellia capillaris may be distinguished from *P. distans* by the form of its panicle which is narrower, mostly contracted and often somewhat dense, both before and after flowering, with mostly ascending, rarely spreading or reflexed, branches, and by the relatively narrower less blunt and mostly slightly longer lemmas. *Puccinellia distans* is usually taller, with wider leaf-blades, broader and looser panicles, the branches in clusters, bare for up to half their length and becoming reflexed at maturity.

—C. E. HUBBARD & E. MILNE-REDHEAD.

THE ORIGIN OF THE LONDON PLANE

Specimens of the Western Plane (*Platanus occidentalis*), the Eastern Plane (*P. orientalis*) and their putative hybrid the London Plane (*P.* × *hybrida*) were exhibited. The geographical isolation of these species to the Eastern United States and to the Balkans and Turkey respectively, was shown on a map. These two groups of populations have presumably been unable to inter-breed since the middle Tertiary period, but are assumed to have hybridized soon after their introduction to Britain in the 17th Century.

There are a number of curious inconsistencies in this supposed origin of the London Plane. Specimens showing the variation of distinct clones of the London Plane were exhibited. These have commonly been presumed to be back-crosses or segregates of the original hybrid, which is surprisingly pollen-fertile. As the Western Plane apparently never reaches reproductive maturity in the British Isles at the present time: it is hard to see how the original hybrid could have arisen. Most trees of the London Plane produce inviable fruits, despite their pollen fertility. On the other hand, regeneration from seed has been noted on several occasions, and the seedlings are reportedly diverse in morphology. Meiosis in the London Plane was shown to be regular despite the reasonable expectation that some structural chromosome rearrangements would have accumulated between populations so long isolated: meiosis of the F_1 hybrid would have manifested these differences.

The frequent absence of viable embryos in the fruits may be due to the plants being self-incompatible. Undoubtedly wild *Platanus orientalis* in the Anti-taurus Mountains are variable in leaf form. Chance selection from such viable populations was postulated to account for the limited number of vegetatively propagated types of London Plane in cultivation.—B. M. G. JONES.

WHAT IS A RARE SPECIES?

The purpose of this Exhibit was, first, to define graphically, as far as was possible, the concept 'rare species', and then, by means of maps, to show how the distribution within the British Isles of the species listed—those which, according to the *Atlas of the British Flora*, occur, post-1930, in 15 or fewer 10 km. squares of the National Grid,—may be correlated with the distribution of certain environmental factors, either singly or in combination, namely maximal winter temperature, high altitude and the presence of chalk or limestone deposits.

These results were derived from the basic data used in the production of the Atlas; this information is now housed in the Biological Records Centre of the Nature Conservancy at Monks Wood Experimental Station, Huntingdon.

—P. JOSLIN & Miss N. M. HAMILTON.

THE EFFECTS OF ALTITUDE ON PLANT GROWTH

The demonstration reviewed some preliminary work on changes of communities, individual species and growth rates in relation to altitude. Ordination of *Dryas octopetala* communities shows an altitudinal basis which agrees with *Dryas* noda described by McVean and Ratcliffe. Collections of individual species from Scotland and Austria demonstrated decrease in production, total growth, fruit size, etc., with increase in altitude. The growth of species of *Melampyrum* and *Galium* was shown to correspond with temperature characteristics of a 5,000 ft. range in the Austrian Tyrol. Where there are overall differences in the lapse rates for the same altitudinal range, the growth of plants responds to lapse rates as shown by *Trichophorum caspitosum.* Using "Ymer" Barley grown on a standard soil in pots on three climatically differing sites—production over a 1,000 ft. range was found to be greater in Central Scotland (Grampians) than that on similar sites in the north of Sutherland over the same time period.—J. B. KENWORTHY.

THE USE AND MISUSE OF MAP GRIDDING

An exhibit of a proof copy of an article on Map Gridding subsequently published in the January issue of the *Irish Naturalists' Journal* (vol. **16**, pp. 2-4, (1968)) explaining the science of Map Gridding and the reasons why the distribution maps for Ireland, as shown on the *Atlas of the British Flora* published by the Botanical Society of the British Isles, are inaccurate in terms of the Ordnance Survey Department Maps and the Irish National Grid System.—Miss M. P. H. KERTLAND.

VARIATION IN THE BRITISH SUBSPECIES OF *Rhinanthus minor* L.

Herbarium specimens and distribution maps were exhibited of the six subspecies of *Rhinanthus minor* L. named according to the latest revision by P. D. Sell. (*Watsonia*, **6**(5), 298 (1967)).

Difficulty in identification is mainly due to the overlap of measurements given for the diagnostic characters, caused by the wide ranges of morphological variation and probably to inter-subspecific hybridization. Diagrams were shown to illustrate this overlap in the measurements given by the *Flora of the British Isles* by A. R. Clapham, T. G. Tutin & E. F. Warburg (1962) and by P. D. Sell (1967).

Examples of polygon diagrams based on the following characters were shown: height, leaf length, leaf breadth, leaf length/breadth ratio, number of intercalary leaves, and number of vegetative internodes. These have proved useful both for showing differences between the subspecies and also for comparing different populations and different gatherings of the same population.—Mrs A. L. LEAN.

Eriocaulon aquaticum (E. septangulare) IN ARDNAMURCHAN

The distribution of *Eriocaulon aquaticum* has certain affinities with that of *Spiranthes romanzoffiana*. Both were known only in Ireland and in the Western Isles of Scotland. In 1953, however, a small colony of the latter, which seems since to have increased considerably, was found on the mainland, in Ardnamurchan.

In 1967 *Eriocaulon* was similarly found in Ardnamurchan. Mr W. Dolling was with a party which climbed inland into the hills of Ardnamurchan, where he spotted a few plants by a lochan. The living exhibit was the voucher he brought home.

—D. MCCLINTOCK.

Symphytum leonhardtianum PUGSLEY AND *S. tuberosum* L.

Specimens were exhibited of presumed *S. leonhardtianum* from the two Co. Down localities given in the *Flora of the North-East of Ireland*, 2nd ed., by S. A. Stewart & T. H. Corry (1938) and from Newcastle in the same county. The only other reference to this species (apart of course from its original description in the *Journal of Botany*, **69**, 89-97, (1931)) is to a specimen from a road-side at Navan (see Praeger R. L., *Proc. R. Ir. Acad.*, **45**, 231-254 (1939)), which may or may not be representative of its population. Search in the folders of the British Museum (Natural History) failed to substantiate the distinctions between this species and *S. tuberosum*. Unless therefore further evidence is discovered, it seems best to treat *S. leonhardtianum* as a synonym of *S. tuberosum*.

A fuller note on this subject appeared in the *Irish Naturalists' Journal*, **16**, 21-22, (1968).—D. MCCLINTOCK.

Pilosella flagellaris (WILLDENOW) SELL & C. WEST SUBSP. *bicapitata* SELL & C. WEST

This exhibit illustrated the note published by W. Scott in *Proc. bot. Soc. Br. Isl.*, **7**, 192-193 (1968) on the first species of the genus ever recorded in Shetland, the first British records of a native *Pilosella* with branched scapes and indeed the first records in the world for this new taxon.

At a glance the Shetland plant resembles no other hawkweed, but study of it by Mr Sell and Dr West showed that it had close affinities with the variable *P. flagellaris* subsp. *flagellaris*. This is a native of Central Europe and as such does not come nearer than 1,000 miles to Shetland, but it is naturalised in a few places in Britain, notably around Edinburgh. Here therefore were two taxa widely separated in space but apparently closely related. It is fascinating to speculate how they diverged from their common ancestor. The two subspecies differ in size, indumentum and branching habit; the type has numerous, very long, ramping stolons, stems two or three times taller—to one foot, forked more often and higher up, and shorter less dense hairs, particularly on the stems.

Where else will it be found?—it is not immediately easy to distinguish from various other rosette plants for its short stolons may not appear at all, as was shown by the growing plants exhibited. Moreover plentiful grazing sheep are no encouragement to flowering. Herbarium specimens (from all three Shetland localities), living plants, and drawings by Miss K. Hollick of both taxa were shown, together with a photo by Mr J. Peterson of Lerwick and a painting by Miss Grierson of Kew of subsp. *bicapitata*.

—D. McClintock.

BAMBOO SEED

During the last year or two, some 14, among the 30-odd species of bamboo currently grown in the British Isles, have shown flower. Yet seed is usually rare, and seedlings even rarer; while on six of the species which have recently been in flower, no seed has been detected at all.

Samples of seed from six species were shown. In addition, herbarium sheets of *Arundinacea japonica* and *Sasa palmata* showed how this seed often (but not always e.g. in *Thamnocalamus falconeri* also exhibited together with two, living, seedlings,) stands out prominently like a shiny 'beetle' in the inflorescence; but the bulging seed drops readily when ripe, so does not often survive on to, or on, a herbarium sheet. The fourth sheet shown (there is a duplicate at Kew) was of apparently the first flowering of *A. disticha* in this country—on which seed was forming.

More details on the flowering of bamboos are in an article under that title in the December 1967 issue of the *Jl. R. hort. Soc.*, 521-6.—D. McClintock.

Aster macrophyllus L. AND *A. schreberi* NEES

A. macrophyllus has been recorded from Lochside Station, Renfrewshire v.c. 76 since 1931, an attribution repeated in various standard works. Examination of this still flourishing patch, however, shows that it should rather be referred to the closely allied, also N. American, species *A. schreberi*, an opinion confirmed by Dr Yeo at Cambridge and Mr Jeffrey at Kew. This differs in its whitish-grey florets and eglandular inflorescences. In so far, therefore, as this is considered a wild plant, it should be called *A. schreberi* and not *A. macrophyllus*.

True *A. macrophyllus* was collected at Swanley, W. Kent in 1946, but appears no longer to be there. Until it is rediscovered, this species hardly deserves a place in our lists.

A full note on the subject is appearing in the *Glasgow Naturalist*.—D. McClintock.

Veronica SECTION *Beccabungae*

Specimens of diploid and tetraploid species of the section were exhibited. *Veronica catenata* Pennel ($2n = 36$), *V. anagallis-aquatica* L. and the almost completely sterile hybrid formed between them were compared with the south-eastern European diploid species *V. anagalloides* Guss. The diploid species *V. beccabunga* L. was exhibited along with the morphologically similar North American tetraploid species, *V. americana* (Rafin.) Schweinitz ex Benth.

Variation of leaf size in populations of *V. beccabunga* L. is being investigated using 'Xerox' leaf prints. Prints of a large-leaved and a small-leaved field collected material were shown and compared with cultivated material of the same collections. It was pointed out that variation in this species, at least in the populations investigated, appears to be environmentally controlled.—N. MARCHANT.

SOME NEW BRITISH *Taraxacum* SPECIES

Herbarium specimens were exhibited of 18 *Taraxacum* species new to the British Flora. The number of species now certainly known for Britain is about 100. The specimens were accompanied by notes on their identification and distribution, and maps showing the known British and continental distribution of these species were also displayed.—A. J. RICHARDS.

INTERESTING PLANTS RECENTLY COLLECTED IN IRELAND

Herbarium specimens were exhibited of two plants whose distribution in Ireland has become further known through determined seeking, *Eriophorum gracile* Roth (specimen from the 'Scraw Bog', N. of Mullingar, Co. Westmeath, H. 23, D. M. Synnott and M. J. P. Scannell) and *Deschampsia setacea* Hack., previously known only from Cregduff Lough, Roundstone, and other stations in Connemara, W. Galway, H. 16.

Herbarium specimens were also shown of an exceptionally long bracted *Carex diandra* Schrank from Ballyogan Lough, Burren, Co. Clare, and of *Juncus bufonius* L. subsp. *foliosus* (Desf.) Maine & Weiller from mainland N.E. of Slyne Head, W. Galway, H. 16, July 1967. The earliest specimen of this plant in Herb. DBN appears to be that labelled 'roadside, Laragh, Co. Wicklow, July 1894, R. Ll. Praeger'. The subspecies has now been recorded from eight Hibernian vice-counties.
—BOTANY SECTION, NATURAL HISTORY DIVISION, NATIONAL MUSEUM OF IRELAND.

Centaurea nigra L

See *Proc. bot. Soc. Br. Isl.*, 7(4) for an account based on material forming this exhibit.—D. J. OCKENDEN & T. WHIFFEN.

LEAVES FROM THE 'CRITICAL SUPPLEMENT'

Specimen pages from the *Critical Supplement to the Atlas of the British Flora.*
—F. H. PERRING & P. D. SELL.

NETWORK RESEARCH ON *Silene vulgaris* (MOENCH) GARKE AGG.

Descriptive material related to the new Network Research Scheme of the Society.
—J. P. SAVIDGE.

'*Dipsacus fullonum*'

This exhibit demonstrated a correlation of various school subjects centred on a study of the two subspecies of the Common Teasel. A more detailed account of the work on which the exhibit was based appears on page 337 of this part of *Proc. bot. Soc. Br. Isl.*—SHEPHALBURY SCHOOL, STEVENAGE.

CYTOLOGICAL AND PHYTOCHEMICAL STUDIES IN *Arenaria* AND RELATED GENERA

In addition to confirming previous chromosome counts (Favarger 1962) of several species (e.g. *Arenaria gypsophiloides* L., *A. orbicularis* Vis., *A. montana* L.) counts have been made of some species whose chromosome number has not previously been reported or for which another number has been recorded. The counts from *A. dianthoides* Sm. and *A. cucubaloides* Sm. (both $2n = 22$) are new and conform to the known base number of subgenus *Eremogone* but the high polyploidy found in the *A. procera* group ($2n = c.104$, $c.114$) is unexpected because Favarger (1962) records $2n = 44$ for *A. graminifolia* (= *A. procera* subsp. *glabra*). These high and apparently variable numbers suggest, along with other evidence, that agamospermy may occur in this species complex.

Detection of phenolic compounds by paper chromatography (Harborne 1959) reveals two chemical constituents of systematic interest, one an unidentified cinnamic acid ester and the other the glycosides of quercetin. The former is always found to be present in species of *Arenaria* subgenus *Eremogone* and to be absent from subgenus *Arenaria;* it also appears characteristic of *Minuartia* section *Spectabiles* but its exact distribution in the rest of the genus and in the Alsinoideae as a whole has not yet been established. The presence or absence of a particular glycoside may be characteristic of individual taxonomic groups, e.g. the absence from the genus *Moehringia* of the otherwise ubiquitous triglycoside of quercetin.

Fischer (1930) and Bouché (1955) have shown that saponin distribution may be of systematic value at generic level in the Caryophyllaceae. Saponins were detected using paper chromatography with additional use of spray reagent, and their distribution suggest that *Moehringia intricata* Willk. might be more correctly placed within *Arenaria*, a conclusion supported by chromosome data (cf. Merxmüller & Grau, 1967).

Fresh leaves and herbarium specimens were used for the detection of both phenolic compounds and saponins apparently with comparable results.

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—Miss Si Si.

PLANTS OF ARRAN

Arran is rich in plant life and several interesting species are to be found there, particularly in the vicinity of the coast. The island is situated in a sheltered position in the Firth of Clyde and enjoys the warming influence of the Gulf Stream. The climate is therefore mild and moist and well suited to plants.

Herbarium specimens of the rarer and interesting species were exhibited including two ferns, *Dryopteris aemula* and *Polypodium vulgare* subsp. *prionodes* Rothm. Among the higher plants were *Rhynchosinapis monensis* from the dunes at Blackwaterfoot, *Sorbus pseudofennica* which is endemic in Glen Diomhan, *Circaea alpina* abundant in a few localities under bracken and *Oenanthe lachenalii* from Lamlash. Other species were *Mertensia maritima* local on the shore at Lagg, *Calystegia soldanella* among Marram on the dunes at Blackwaterfoot and *Blysmus rufus* from the shore at Imachair where it appears to be associated with the presence of fresh water.

Herbarium specimens of 6 new records for the island were also exhibited:—*Juniperus communis* subsp. *nana* from the bank of the Catacol Burn, *Potentilla reptans* near the shore at Kildonan, *Parietaria diffusa* on the walls of Brodick Castle, *Vaccinium macrocarpon* established near the shore south of Brodick, *Veronica montana* in small quantity north of Sannox Bay and *Lamium amplexicaule* from Lamlash.

Photographic studies in colour of the following species were also included:—*Asplenium trichomanes*, *Impatiens glandulifera*, *Rosa rugosa*, *Ligusticum scoticum*, *Mertensia maritima*, *Verbascum thapsus*, *Pinguicula lusitanica* and *Platanthera chlorantha*.—Mrs A. H. SOMMERVILLE.

Juncus ranarius IN BRITAIN?

Herbarium specimens of *Juncius bufonus* L. *sensu stricto* and of a segregate of it recognised as *J. ranarius* Song. & Perr. on the Continent were exhibited, together with a scatter diagram based on the six main characters which may be used to distinguish them.

There is a distinct correlation between the six characters used, but there are a number of plants which are intermediate between the usual conception of the two segregates. One may conclude that there are found in Britiain plants which are identical with those known on the Continent as *J. ranarius*, but that it is far from certain whether or not they should be recognised as a separate species. Such plants are more or less confined to maritime habitats on the west coasts.—C. A. STACE & J. E. LIONS.

ANATOMICAL STRUCTURE OF AQUATIC MONOCOTYLEDONS

The exhibit was in the form of line drawings many of which will be published in a forthcoming volume of *Anatomy of the Monocotyledons* a reference book being produced at the Jodrell Laboratory at Kew. The particular drawings included in the exhibit showed the habits of the plants as well as histological details, and were all of aquatic Monocotyledons, represented by the following families, genera and species.

(1) Butomaceae —*Butomus umbellatus*, *Limnocharis flava*, *Hydrocleys nymphoides*.
(2) Scheuchzeriaceae —*Scheuchzeria palustris*.
(3) Lilaeaceae —*Lilaea subulata*.

The above species exhibit a number of common features which appear to be related to their aquatic environment. These are: (1) Specialized aerenchyma in the form of lacunate ground tissue, to be found in all plant organs. (2) Reduced vascular tissue, particularly the xylem which consists mainly of tracheids with vessels of a primitive type confined to the roots. (3) Reduction of mechanical tissue. (4) Absence of hairs. A diagram illustrating the taxonomic position of the plants in Hutchinson's *Families of Flowering Plants* (1926) was also included.

—MARGARET Y. STANT (JODRELL LABORATORY, ROYAL BOTANIC GARDENS, KEW).

STUDIES IN BRITISH *Polygala* SPECIES

'*P. oxyptera*'

Pawlowski's (1958) clear separation of *P. oxyptera* Reichb. and *P. vulgaris* L. in Poland is shown not to be possible in Britain. Histograms of ratios of capsule length to wing-sepal length and wing-sepal breadth to capsule breadth derived from British material do not reveal the discontinuity evident in Pawlowski's data. Wide variation exists in the relative breadths of the ripe capsule and the wing-sepal both within British populations and within individual plants.

P. serpyllifolia

Some morphological characters distinguishing *P. serpyllifolia* J. A. C. Hose from *P. vulgaris* were illustrated, and the distinction was reinforced by a chromatogram showing possible chemical differences between the two species. Alcohol extracts of *P. vulgaris* leaves contain a cinnamic acid ester apparently not present in similar extracts of *P. serpyllifolia* leaves.

Many characters often used in the diagnosis of *P. serpyllifolia* cannot be relied upon when taken alone. Specimens of *P. vulgaris* demonstrate the *P. serpyllifolia* characters of occasional opposite leaves and primary inflorescences overtopped by laterally produced inflorescences. Likewise, a specimen of *P. serpyllifolia* without clearly opposite leaves was also shown.

Confusion arises amongst authors concerning the relative dimensions of wing-sepal and capsule in *P. serpyllifolia*. Diagrams derived from British material show that wing to capsule ratios vary even more within *P. serpyllifolia* populations than within *P. vulgaris* populations.

REFERENCE

Pawlowski, B. (1958). De *Polygalis* polonicis annotationes criticae. *Fragm. Flor. geobot.*, 3 (2), 35-68.

—I. C. Trueman.

SOME TEMPERATE ZONE PTERIDOPHYTES

This exhibit was divided into two parts.—

(a) demonstrating the use of herbarium specimens in botany teaching viz. the value of labels, distribution maps and photographs attached to the herbarium sheet.

(b) a pupil's collection of ferns made in a single afternoon by the River Lyn in North Devon, being his first attempt at preparing herbarium material.

—A. S. Warde & B. F. C. Sennitt.

A FLORISTIC SURVEY OF YARNER WOOD NATIONAL NATURE RESERVE

The exhibit showed the results of a preliminary investigation into the taxonomic status of Oakwoods in the South-West, and the numerical analysis of a floristic survey of one of these woods—Yarner Wood N.N.R.

A number of pictorialised scatter diagrams representing Devon oak populations were displayed. These diagrams suggested that the populations could be classified into four groups:—woods dominated by *Quercus robur*, woods dominated by *Quercus petraea*, mixed woods containing both species, and woods showing evidence of introgressive hybridisation between the two species. It was noted that the *Q. robur* woods grew on the acid soils of the Dartmoor granite—an unexpected soil type for this species. The introgressed woods occured on the metamorphic aureole between the granite and the surrounding country rocks. This can be accounted for by the fact that the soils of the aureole contribute to a 'disturbed habitat', generally considered a factor determining introgressive hybridisation.

The floristic survey of Yarner Wood used a series of existing transects which were used as a basis for a grid system of quadrats. The species were recorded as being either present or absent. The quadrats were four square metres. If no trunks of trees occured inside the quadrat, the species contributing to any canopy were recorded as present.

The data was analysed by Normal and Inverse Association Analysis and Information Analysis. The results were expressed as 'hierarchies' and as 'two-way' tables which are essentially rearrangements of the original presence-absence matrix according to the results of the numerical analysis. The analyses suggested that the population was remarkably homogeneous. A *Querceto-Vaccinietum* nodum, characteristic of a number of Devon oakwoods, formed the main element of the flora.

—D. L. Wigston.

See Plant Notes, pp. 387-393 for accounts based on material forming the following exhibits:

Geranium ibericum, G. platypetalum and G. × *magnificum*	D. McClintock & P. F. Yeo
× *Asplenophyllitis microdon* (T. Moore) Alston	D. McClintock
Bromus (Sect. *Ceratochloa*) in Britain	A. Melderis

Exhibits on the following were also shown:

Paintings from the Pyrenees and South Africa	J. Codrington
The evolution of *Cardamine flexuosa*	R. P. Ellis
Stereophotographs of white varieties of British Wild Flowers	J. H. Fremlin
Some botanical postage stamps	Mrs A. N. Gibby
Analytical flower drawings in pen and ink from life	M. Hickey
Anatomy of some aquatic monocotyledones	Jodrell Laboratory, Royal Botanic Gardens, Kew
Some recent botanical literature	The Linnean Society of London
Examples of specimens preserved in cold setting resin	P. Parkinson
Coloured drawings of alpine plants	Mrs B. H. S. Russell
Plant photographs from the Pyrenees	Mrs P. Saunders
Some plants from western Canada	Miss D. E. De Vesian

From 4.15 p.m. the following members gave short lectures and showed colour slides in the Lecture Hall.

Some *Dactylorhiza* species and hybrids in East Yorkshire	Miss E. Crackles
Development of the pappus in ligulate Compositae	H. Meyer
British Alpines in Switzerland	Miss G. Tuck
Alpine Spring for flower lovers	R. M. Burton
C.S.S.F. Field Meeting, Pyrenees, 1967, with slides taken by members of the expedition	Mrs B. H. S. Russell & R. M. Mackechnie

PERSONALIA AND NOTICES TO MEMBERS

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr Perring (address as above) include:

1. 35 mm filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards and 'Trust' Record Cards with numbers substituted by columns. Both at 15/- per hundred.
3. Individual Record Cards, price 10/- per thousand.
4. Base maps of the British Isles with 100 km grid (quarto) and also of Ireland, and Scotland. Price 2d. each.
5. Corrections to the *Atlas of the British Flora:* free on receipt of a stamped addressed envelope.
6. Record cards and instructions for the *Symphytum* survey. Free.

The Centre would like to build up a collection of recording cards: if you have one designed would you please send us a copy?

The Centre would be most grateful for the gift of any out-of-date copies of Bartholomew's 'Gazetteer of Great Britain'—age immaterial.

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact the Hon. Archivist, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF *WATSONIA* AND *PROCEEDINGS*

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete 'runs'. The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part 5 and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

CONSERVATION COMMITTEE NOTICES

Information on threats to the British Flora should be communicated to the secretary of the Conservation Committee of the B.S.B.I., Dr A. J. Richards, The Botany School, South Parks Road, Oxford. Such threats include the possible damage or extinction of rare or local species in a habitat, and interference with interesting habitats. In the case of damage through the use of toxic herbicide sprays, a form listing the information required by the Nature Conservancy to act on such reports will be forwarded. In all cases, the name and address of the land-owner, and a detailed account of the nature of the damage is of the greatest assistance.

An increasing number of attempts to introduce species into habitats in which they are not at present found has made it very necessary that a record be kept of all such experiments. Dr F. H. Perring, The Biological Records Centre, Monk's Wood Experimental Station, Abbots Ripton, Huntington would like to be advised of such attempts, and will send a short list of the information needed to satisfactorily record these experiments on request.

THE BRITISH MUSEUM MULL PROJECT

The Department of Botany of the British Museum (Natural History) has started a field programme in which it is intended that a floristic and descriptive ecological survey of the Island of Mull and its off-lying small islands (v.c. 103, Mid-Ebudes in part) will be made during the course of the next four years. It is envisaged that the work will culminate in the production of a publication of the 'County Flora' type.

Since, unlike the authors of most county Floras, the department is equipped with staff, collection and library to deal, at least in theory, with all groups of plants, it is hoped that the final publication will be of unusually wide taxonomic coverage, covering most cryptograms, and will make a special feature of the ecological and geographical relationship of the flora.

It will be evident to those experienced in work of this kind, that the proposed programme is ambitious and represents a substantial commitment, in an entirely new field of activity, of the department's time and resources. For this reason we shall greatly welcome and appreciate offers of help from all interested persons. We have been very fortunate in gaining the active support and assistance of several Scottish botanists who are interested in the area, and we are already indebted to a number of specialists for the benefit of their expert opinions in certain critical groups.

During the last season four visits to the island, involving 16 members of the staff, have been made. This additional experience has revealed further information of great interest, especially on the cryptogamic groups in the area, which have been very little explored. We shall be very pleased to give information relating to transport, accommodation and local botany, to anyone interested in visiting the island. While its weather cannot be recommended, the scenery and interest of the area does much to outweigh this disadvantage, and Mull and the associated area can be recommended confidently to those looking for a botanical holiday away from the well trodden paths to the famous shrines. We are well aware that, limited as we are by considerations of distance and time, our work can be greatly enriched by the help of others, which would of course receive appropriate recognition in the final publication.

If you can help or would like any further information, please write in the first instance to J. F. M. Cannon or E. B. Bangerter, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

TARAXACUM

Dr A. J. Richards, The Botany School, South Parks Road, Oxford is working on the taxonomy and distribution of British *Taraxaca*. Herbarium specimens, if possible with ripe seeds, would be gratefully received. Annotations on posture of the exterior bracts, colour of the style and stigma (pure yellow or discolored), presence or absence of pollen, and the presence of colour on the petiole and median nerve of the leaf are of great assistance. Devon, Cornwall, The Wye Valley, The Hebrides, and Ireland are particularly underworked in this genus, and material from these areas would be of great interest. *Vulgaria* (*T. officinale*) should not be collected after May 31st.

FOLKESTONE NATURAL HISTORY SOCIETY

The Society celebrated its 100th Anniversary in March, 1968 and to mark the occasion a Centenary Publication has been produced with contributions by members and others intimately connected with natural history in Folkestone. The Centenary Publication is priced at £1-0-0 (15/- to members of Folkestone Natural History Society) and is obtainable from the Hon. Secretary, Miss V. Day, N.D.H., F.R.H.S., 18 Wear Bay Crescent, Folkestone.

FLORA OF LEICESTERSHIRE

An autonomous committee has been formed to begin work on the preparation of a new County Flora of Leicestershire. Any offers of help in recording on a 4 square kilometre 'tetrad' basis would be greatly appreciated, and also any existing records. Communications should be addressed to the Hon. Secretary of the Leicestershire Flora Committee:

Rev. A. L. Primavesi, Ratcliffe College, Syston, Leicester, LE7 8SG.

FLORA OF V.C.104 N. EBUDES

Owing to unforeseen circumstances, R. I. Sworder much regrets that he is unable to continue with this project. Anyone who may be interested in this area is asked to get in touch with Mrs C. W. Murray, Prabost, Skeabost Bridge, Portree, Isle of Skye, who is preparing a Flora of the same area but excluding The Small Isles.

BRITISH LICHEN SOCIETY DISTRIBUTION MAPS SCHEME

Members wishing to help the British Lichen Society with their mapping scheme based on the 10 km grid square system are asked to contact the Mapping Recorder, M. R. D. Seaward, Biology Dept., Loughborough College of Education, Loughborough, Leicestershire.

VERONICA SECTION *BECCABUNGAE*

N. G. Marchant, Botany School, Downing Street, Cambridge, is investigating variation in the species of *Veronica* section *Beccabungae*, and would be grateful for herbarium specimens and, if possible, seeds of these species.

ANNUAL SPECIES OF *SILENE*

Mrs E. Bari, Botany School, Downing Street, Cambridge, would be grateful for samples of wild-collected ripe seed of annual species of *Silene* from Britain or the Continent. Recently collected, unpoisoned herbarium material would be most welcome if a ripe sample could be extracted.

SCIRPUS

Dr J. K. Spearing of the Department of Botany and Zoology, Sir John Cass College, Jewry Street, London, E.C.3, is anxious to obtain viable seeds from reliably determined species of *Scirpus* (*sensu lato*), or alternatively fresh specimens with roots attached, for a comparative study of root anatomy of this genus. Notes on the provenance of specimens would be appreciated. Postage and packing costs will be refunded.

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All manuscripts to be considered for publication in *Watsonia* should be sent to Dr M. C. F. Proctor, Department of Botany, Hatherly Laboratories, University of Exeter, Prince of Wales Road, Exeter, Devon.

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CONTENTS

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Names of British vascular plants should normally follow the *List of British Vascular Plants* by J. E. Dandy (British Museum (NH) and B.S.B.I., London, 1958) and may then he cited without authorities. Otherwise author's names must be cited at least on the first occasion where they appear in the text.

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Proceedings of the Botanical Society of the British Isles

December 1968 Volume Seven Part Three

Contents

Dony, J. G. Presidential Address 1968: The B.S.B.I. in a changing Britain 311-323

Messenger, K. G. A Railway Flora of Rutland. 325–344

Webb, D. A. & Hodgson, J. The Flora of Inishbofin and Inishshark 345--363

Cannon, J. F. M. & Bangerter, E. B. Plant Records from Mull and the Adjacent Small Islands 365–372

Shimwell, David W. Notes on the Distribution of *Thlaspi alpestre* L. in Derbyshire. 373–376

Topham, P. N. The Fuller's Teasel 377–381

Yeo, P. F. *Euphrasia stricta* Lehm. in Geurnsey. 383–385

Plant Notes 387–393

Plant Records. Compiled by E. C. Wallace 395–400

Abstracts from Literature. Compiled by D. H. Kent 401–494

Obituaries 495–496

Reports

- Report of the Council for 1967 497–500
- Teesdale Defence Committee 501
- Committee for the Study of the Scottish Flora: Thirteenth Annual Report to 31st December 1967 502–503
- North-east Regional Meeting, York, 1967 503
- Exhibition Meeting, 1967 504–515

Personalia and Notices to Members 517-520

Instructions to Contributors 521-522

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Continued on inside of back cover

Proc. bot. Soc. Br. Isl. 1969, *Vol.* 7, (4).

ADDITIONAL NOTES ON THE FLORA OF BEDFORDSHIRE

J. G. DONY

INTRODUCTION

The *Flora of Bedfordshire* was published in 1953 and in the following fourteen years its author was engaged mainly in collecting records for a Flora of the neighbouring county, Hertfordshire. In this period a number of plant records have been made by resident botanists and visitors to the county. It is on these records, supplemented by my own, that this account is based.

From 1953 to 1964 an annual report on botanical changes was contributed to the *Bedfordshire Naturalist*, the journal of the Bedfordshire Natural History Society and Field Club, which has also a report of an annual Fungus Foray led most years by Mr D. A. Reid. Some additional bryophyte records have also been made mainly as a result of visits by Dr H. L. K. Whitehouse with students from Cambridge to Flitwick Moor. The additions to the cryptogamic flora are not listed here but can be supplied to any interested persons.

The administrative county has changed considerably since 1953 with the transfer of a large part of the botanically interesting parish of Eaton Socon to Huntingdonshire and of the parish of Linslade from Buckinghamshire to Bedfordshire. In 1964 Luton became a county borough. Changes in the flora which have resulted from these political necessities are not considered here and for the conveniences of comparison the limits of the county are taken as those of 1953. A future revision of the flora may need to deal with them.

HABITAT CHANGES

Within the area considered here there have been many changes to sites which in 1953 had some botanical interest.

Habitat Study 5. Judge's Spinney has been subject to despoliation and has lost much of its ground vegetation.

Habitat Study 10a. Marsh, Stevington. This has now been drained with the loss of *Anagallis tenella* in its only recent station in the county.

Habitat Study 38. Flitwick Moor. This interesting part of the Moor was ploughed in 1962 and has since remained fallow. It is to be hoped that its flora has been lost only temporarily.

Habitat Study 70. Maulden Firs. The wood has been felled and the site now ploughed.

The wall at Leagrave Station which had an unusual assemblage of ferns was rebuilt in 1960 when steam locomotives gave way to diesel engines and even before this Ampthill Station was closed and its platforms subsequently demolished.

The loss of sites of botanical interest has been to some extent compensated for by successful ventures in conservation.

Habitat Study 59. Knocking Hoe. In 1959 this was declared a National Nature Reserve. The Nature Conservancy has now some experimental plots on the hill.

Habitat Study 62. Totternhoe Knolls. The Bedfordshire County Council now exercises the control previously held by the Totternhoe Board of Conservators and intends to declare it a Local Nature Reserve. In the meantime scrub clearance is being undertaken by a Management Committee of the Bedfordshire and Huntingdonshire Naturalists' Trust (formed in 1960) on which there are representatives of Totternhoe Parish Council.

Habitat Studies 84 and 85. Well Head, Leagrave, and Leagrave Common. These have undergone a number of changes including a rise in the water level resulting from surface drainage from a neighbouring housing estate being channelled into the river. A flora which it had been feared was lost is now returning.

The county is fortunate in having two other reserves. One is part of the grounds of Sandy Lodge, the headquarters of the Royal Society for the Protection of Birds, the other some gravel pits, leased by the Trust, at Felmersham. The vegetation of these reserves has been recorded and is being conserved but the sites are not of outstanding botanical importance.

BOTANICAL HISTORY

Some items of considerable historical interest have recently emerged. Charles Abbot (1761-1817) was very proud of his herbarium which was ultimately acquired by C. Longuet Higgins of Turvey Abbey. It was seen there by R. A. Pryor who in 1881 wrote a long report on it noting that it consisted of five folio volumes. In 1945 The Rev. H. H. Longuet Higgins deposited the same five volumes on long loan at Luton Museum and Art Galley when it was assumed that this was the full extent of Abbot's herbarium. In 1968 the Museum purchased from a bookseller a folio volume bound in the same way as the other five and containing as they did the bookplate of C. Longuet Higgins dated 1874. It is clearly a sixth volume of Abbot's herbarium including plants in the Linnean Class XXIV onwards, i.e. the Cryptogams. The additional volume is, however, of no greater value than the rest as the specimens are neither localised nor dated.

By the same means the Museum purchased yet another and hitherto unknown Abbot herbarium. This consists of four quarto volumes each of which contains Abbot's bookplate as well as that of C. Longuet Higgins dated 1874. On the spine of each volume, in which the plants are not arranged in any order, is printed 'Flora Selecta'. This smaller collection is of much greater importance than the larger one as all the specimens in the first volume and a few in the remaining ones, about a hundred in all, are localised but unfortunately not dated. Most of these specimens were collected in Bedfordshire and must rank as the first documented evidence of the species to which they refer for the county.

It is surprising that Pryor when he visited Turvey Abbey did not see the sixth volume of Abbot's larger herbarium and the 'Flora Selecta' which would have been of considerable interest to him. It is possible that they had not at that time been acquired by Longuet Higgins but it seems more likely that at some time between 1874 and the date of Pryor's visit, which was probably as early as 1878, they had been separated from the rest.

In 1956 Sir George Taylor lent me a copy of Abbot's *Flora Bedfordiensis* in which W. W. Newbould had made annotations from a copy of Broughton's *Enchiridion* which had been annotated by Abbot. These annotations which give many additional stations for plants have been transferred by me into an interleaved copy of the *Flora of Bedfordshire* now at Luton Museum. At about the same time Miss J. C. N. Willis lent me some delightful drawings of plants made by Caroline Gaye between 1831 and 1863. Many of these were of Bedfordshire plants found growing near to Shefford and her drawing of *Orobanche rapum-genistae* (1832) must count as the first record of this species for the county.

In 1954 the Franks Herbarium (see *Flora of Hertfordshire* p. 13) was presented to Luton Museum. This consists mainly of specimens collected in Hertfordshire but it contains also the first record of *Erica cinerea* (1819) for Bedfordshire.

The only original work of importance published on the flora of the county since the publication of the *Flora* is R. H. Richens' account of the Bedfordshire elms. This was one of a series of studies of the very varied elm populations of East Anglia and it was useful to know how the elms of the county compared with those of some of the neighbouring counties.

THE NATIVE FLORA

Some species which appeared to be locally frequent in the county in 1953 have now diminished to an extent that they may be considered to be possibly extinct. Three are cornfield weeds: *Agrostemma githago*, *Torilis arvensis* and *Galium tricornutum* (*G. tricorne*), the last-named to be found now, to the best of my knowledge, only in Miss Elwell's garden at Dunstable where it grows spontaneously. In recent years *Sium latifolium* has become very scarce in the River Ouse, where until 1953 it appeared to be frequent.

The more interesting plants of the county which have since 1953 attracted visitors to Bedfordshire are, I am glad to say, mainly still to be found as they were described in the *Flora*. These include *Alyssum alyssoides*, *Trifolium ochroleucon*, *Seseli libanotis*, *Cuscuta europaea*, *Melampyrum cristatum*, *Hypochoeris maculata*, *Bunium bulbocastanum* and *Ornithogalum pyrenaicum*. *Cerastium brachypetalum* has exactly the same distribution in the railway cutting at Sharnbrook Summit as it had when E. Milne-Redhead first found it there in 1946. As it has neither increased nor decreased in abundance it may now safely be considered to be a native species awaiting further records in similar permanently disturbed places on the Oolite. On the other hand *Lapsana intermedia* found by Milne-Redhead on a railway bank at Sewell in 1945 has diminished as the line is little used and the bank has become overgrown with bushes. I could find only one plant in 1967. The remaining meadow on Totternhoe Mead in which Caraway (*Carum carvi*) grows as a native plant has, in recent years, been heavily grazed but the plants no doubt survive. I saw it there last in 1965. The hedge which gave shelter for *Melampyrum arvense* at Bidwell was removed about ten years ago since when the bank has become overgrown with *Clematis*. The *Melampyrum* barely survives here but it continues to thrive below a hedge at Stagsden. It has disappeared from an arable field nearby where it had been a feature for about sixty years. The flooded pit at Arlesey still has *Lagarosiphon major* as its dominant species and in 1967 H. B. Souster and I found a similar site at Odell in which the *Lagarosiphon* was equally abundant. At Rowney Warren, where *Orobanche rapum-genistae* thrived, the broom on which it was a parasite was killed by the severe frosts in the winter of 1962-3. The broomrape disappeared for two seasons; one plant was seen in 1965 but none have been seen since.

Among the species which have increased in number are *Veronica filiformis* and *Senecio squalidus* while *Epilobium adenocaulon* is more common than the records in the *Flora* made it appear to be. Mr A. W. Guppy has drawn attention to an increase in *Impatiens parviflora* and *Geranium lucidum* in some places in Bedford. He has also noted that the stations given in the *Flora* for *Inula helenium* and *Serratula tinctoria* at Ravensden, Cleat Hill and Thurleigh refer to one place only where both species still survive.

LIST OF SPECIES

Listed below are additional species to the county flora with notes on the extension of range of some of the rarer species. Notes are also added giving information additional to that given in the *Flora*. The following abbreviations are used.

! After a station indicates that the species has been seen there by the author.
! After a person's name indicates that it is a joint record with the author.
‡ before a number of the species indicates that to the best knowledge of the author it is an additional record for the Watsonian vice county.
§ A wool adventive.

BIRM	Herbarium,	Dept. of Botany, The University, Birmingham.
BM	,,	Dept. of Botany, British Museum (Natural History).
K	,,	Royal Botanic Gardens, Kew.
E	,,	Royal Botanic Garden, Edinburgh.
CGE	,,	Botany School, The University, Cambridge.
OXF	,,	Botany School, The University, Oxford
LO	,,	J. E. Lousley.
LTN	,,	Luton Museum and Art Gallery.

The numbers given are those of the *List of British Vascular Plants*, Dandy (1958).

24/5. GYMNOCARPIUM ROBERTIANUM (Hoffm.) Slosson. Railway wall, Ampthill Station, 1954 (LTN), T. D. V. SWINSCOW!

46/7. RANUNCULUS SARDOUS Crantz. Arable field, Swineshead, 1958 (LTN), L. G. ADAMS. The first record since 1889.

‡ 66/4. FUMARIA BASTARDII Bor. Arable field, Maulden, 1961 (LTN) det. N. Y. SANDWITH.

‡ 79/3. LEPIDIUM HETEROPHYLLUM Benth. Oakley, 1954 (LTN), W. DURANT. The previous records were all doubtful.

‡ 79/6. L. LATIFOLIUM L. Roadside, Sundon Park, Luton!, 1967 (LTN), S. M. SMITH and I. R. WILLIS.

‡ 97/2. CARDAMINE AMARA L. Riverside, Tempsford, 1960 (LTN), P. RIXON; side of Ivel Navigation, Clifton!, 1964 (LTN), V. H. and B. CHAMBERS.

168/12. GERANIUM ROTUNDIFOLIUM L. Waste ground, Queen's Park, Bedford, 1967, A. W. GUPPY.

171/3. IMPATIENS PARVIFLORA DC. Tempsford, 1877 (BIRM), S. H. ADAMS. Pre-dates the previous first record by forty years.

189/2. ONONIS SPINOSA L. A form with blue flowers persistent in a meadow at Apsley End, Shillington, was shown to me in 1963 by Mrs Lucas, of Shillington Manor.

207/11. LATHYRUS MONTANUS Bernh. North-east end of lake below Baker's Wood, Heath and Reach, 1958, L. G. ADAMS. An extension of range of a rare Bedfordshire species.

‡216/1 × 3. GEUM RIVALE × URBANUM. Putnoe Wood (a well-known station for *G. rivale*), 1954 (LTN), J. W. PARTRIDGE.

225/15. ROSA MICRANTHA Borrer ex Sm. By side of railway, New Mill End Road, near Luton, 1964.

‡ 235/3. SEDUM SPURIUM Bieb. Churchyard wall, probably spread from gravestones, Potton!, 1967, A. BERENS.

249/2. LYTHRUM HYSSOPIFOLIA L. One plant, gravel path, Great Barford House!, 1968, A. BERENS. The means of its introduction is not known.

‡ 262/2. CALLITRICHE PLATYCARPA Kütz. Leagrave Common, 1965, P. M. BENOIT!

‡ 262/3. C. OBTUSANGULA Le Gall. Leagrave Common, 1965, P. M. BENOIT! Both this and the preceding species were subsequently found by Mr Benoit in other places in the county.

280/1. SMYRNIUM OLUSATRUM L. A luxuriant patch now well established on the north side of St. John's railway bridge, Bedford, 1967. A. W. GUPPY, Ivy Hall, Bourne End, Cranfield, 1968, A. W. GUPPY.

300/3. OENANTHE SILAIFOLIA Bieb. Plentiful in ditch by railway, Tempsford, 1954 (LTN), C. T. PRIME! The first record since 1888.

300/6. O. AQUATICA (L.) Poir. Pond, Tempsford, 1954 (LTN), C. T. PRIME! The first certain record since 1888.

‡ 325/15 × 17. RUMEX CONGLOMERATUS × PALUSTRIS. Pond, Warden Abbey, 1954 (LTN), S. P. ROWLANDS!

357/4. ERICA CINEREA L. Ride, Rowney Warren!, 1962, P. J. REAY. Probably introduced with young conifers but now apparently established.

395/1. PENTAGLOTTIS SEMPERVIRENS (L.) Tausch. Clophill Cutting, 1967, Beds. Nat. Hist. Soc. Field Meeting.

434/1. MELAMPYRUM CRISTATUM L. Odell Great Wood, 1968, S. KARLEY. An extension westwards of the known range of this species in the county.

455/2. SALVIA PRATENSIS L. Near Mount Pleasant, Dunstable Downs, 1958, D. C. HILLYARD.

‡ 457/2. PRUNELLA LACINIATA (L.) L. Rough pasture, Great Barford House!, 1962 (LTN), with *P. laciniata* × *vulgaris*, A. BERENS.

‡ 459/1. STACHYS ANNUA (L.) L. Arable field below Ravensburgh, Barton, 1958 (LTN), A. BERENS.

‡ 465/4(2). GALEOPSIS BIFIDA Boenn. Railway siding, Flitwick, 1957 (LTN). This is probably awaiting further records.

‡ 476/s. LEGOUSIA SPECULUM-VENERIS (L.) Fisch. ex Druce. Foot of Warden Hills, Luton! where it appeared for at least three years, 1954 (LTN), L. G. ADAMS and D. C. HILLYARD. This station is not more than two miles from that of an earlier record by J. Vaughan from Lilley Hoo, 1907, see *Flora of Hertfordshire*, p. 92.

‡ 506/4 × 7. SENECIO SQUALIDUS × VISCOSUS (S. × LONDINENSIS Lousley). Sundon Dump, 1957 (LTN), H. B. SOUSTER!

‡ 506/4 × 8. S. SQUALIDUS × VULGARIS. Waste ground, Luton Library, 1965 (LTN).

‡ 556/1. SONCHUS PALUSTRIS L. Two plants, roadside, Upper Dean!, 1968 (LTN), P. RIXON. This is well known as an introduced species at Woodwalton Fen, Huntingdonshire, and is said to occur similarly at Palebrook, Ashton Wold, Northamptonshire, both of which are within fifteen miles of Upper Dean where it is said by the farmer of the adjoining land to have appeared spontaneously a few years ago.

‡ 558/152. HIERACIUM LEPIDULUM (Stenstr.) Omang. Railway cutting, Wymington, 1946 (K), H. K. A. SHAW, det. 1958, SELL and WEST.

559/2. CREPIS SETOSA Haller f. Dunstable, v.c. 20 [Beds.]!, 1962 (LTN), G. ELWELL, see *Flora of Hertfordshire*, p. 99.

588/1. CONVALLARIA MAJALIS L. Woodbury, v.c. 30 [Hunts.], 1947, C. F. TEBBUTT.

590/1. MAIANTHEMUM BIFOLIUM (L.) Schmidt. My attention has been drawn by Sir Eric Leadbitter to the *Phytologist* for May 1843, 579-580, where the discovery of this species about ten years earlier in Aspley Wood is reported by Edward Edwards. Dr F. H. Perring has also found a specimen in Herb. Cambridge University labelled 'Aspley Wood, 1837, ex Herb. S. H. Bickham.'

593/1. LILIUM MARTAGON L. Site of old army huts, probably originally planted, Podington, 1968, G. M. GENT; spinney by bank of stream, probably introduced by natural means, Upper Dean!, 1968, Mrs CUMMINS comm. P. RIXON.

625/1. EPIPACTIS PALUSTRIS (L.) Crantz. Chalk slope to west of Dunstable!, 1966, J. WILSON. The first record since 1845.

‡ 636/1(b). GYMNADENIA CONOPSEA subsp. DENSIFLORA (Wahlenb.) G. Camus, Bergon & A. Camus. About twenty plants on chalk slope to south-west of Harlington!, 1958 (LTN), L. G. ADAMS and D. C. HILLYARD. The discovery of this and the preceding species on Bedfordshire chalk downland is of especial interest as there have been similar earlier records of *Parnassia palustris*, *Pinguicula vulgaris* and *Carex pulicaris* (see *Flora of Bedfordshire*). The record of the *Epipactis*, the most noteworthy since the publication of the *Flora*, is of added interest as it was found on well-established downland and some distance from the previous stations for marsh species on the Bedfordshire chalk. It flowered well in 1966 but no flowers appeared on the plants in 1967. The *Gymnadenia* was found a short distance from a previous station for the three species listed above. The plants were observed to be in full flower about a fortnight later than those of subsp. *conopsea* growing only a few feet away.

643/3(a). DACTYLORHIZA INCARNATA (L.) Soò subsp. INCARNATA (*Dactylorchis incarnata* (L.) Vermeul.). Totternhoe Mead, 1955.

654/1. ERIOPHORUM ANGUSTIFOLIUM Honck. Blue Water, Bidwell!, 1958, G. ELWELL.

655/4. SCIRPUS SYLVATICUS L. Marsh, Chalgrave Manor, 1958, J. CHANDLER.

656/6. ELEOCHARIS UNIGLUMIS (Link) Schult. Totternhoe Mead, 1955.

663/7. CAREX LEPIDOCARPA Tausch. Blue Water, Bidwell!, 1958 (LTN), G. ELWELL. The record of this and the four preceding are extensions of range of uncommon Bedfordshire species.

663/57 × 71. CAREX OTRUBAE × REMOTA (C. × PSEUDOAXILLARIS K. Richt.). Fancott, 1955 (LTN), L. G. ADAMS.

‡ 671/1 × 2. LOLIUM MULTIFLORUM × PERENNE. Arable field, Maulden, 1954 (LTN), det. C. E. HUBBARD.

‡ 683/4. BROMUS INERMIS Leyss. One large clump, Bradgers Hill, Luton, 1964, T. C. E. WELLS.

684/2. **Brachypodium pinnatum** (L.) Beauv. This was found by T. C. E. Wells in four sites in 1964 during a survey of the Bedfordshire chalk: (1) Galley Hill, one clump, (2) Totternhoe Knolls, small patches, (3) Bradgers Hill, Luton, fairly widespread, (4) Dunstable Downs, several large patches. This is still common on the Oolite but there have been few records from the chalk.

THE ALIEN FLORA

This has increased considerably since 1953 with wool adventives accounting for most of the additions. It was not until 1946 that it was realised that wool waste was used as a fertiliser by market gardeners on the light Lower Greensand soils. The *Flora* listed about 130 species which had been introduced with wool in the previous seven years and it was thought then that few additional species would be recorded. *Spiraea salicifolia* was wrongly listed as a wool adventive in the *Flora* and *Vicia dasycarpa*, *Polygonum patulum*, *Solanum sarrachoides*, *Panicum capillare* and *Dactyloctenium radulans* should have been noted as wool adventives. There are now a further 180 species to be accounted for and it appears that so long as wool waste continues to be used in the county more species will be found. Lousley (1961) recorded 529 species for the whole of Britain. Most of our additional knowledge of wool adventives is due to the research of Mr J. E. Lousley who has made annual visits to the county. His herbarium is rich in specimens collected in Bedfordshire duplicates of which he has presented to public herbaria. There are also many specimens incorporated in Luton Museum Herbarium duplicates of which have gone elsewhere. Some species have been recorded but once, and others many times. A full account of the wool-adventive flora of the county with estimates of frequency of occurrence and citation of specimens would be long and tedious. It must be understood that many of the records could well be credited entirely to Lousley and that his herbarium contains many additional specimens, as does Luton Museum and other herbaria, which are not listed here. Other visitors who paid special attention to the wool-adventive flora include Miss M. McCallum Webster, Dr H. J. M. Bowen, B. T. Ryves, E. J. Clements, J. Mason and B. Wurzell whom I thank for their co-operation.

Bird-seed aliens account for most of the other additional species. Sundon rubbish dump which featured so much in the *Flora* has been less productive in recent years as a result of a change in tipping control. I have made a few visits to Luton Corporation rubbish dump but others in the county may well repay study.

I wish to thank various specialists for their assistance and especially Mr J. P. M. Brenan for his help with the Amaranthaceae and Chenopodiaceae, Dr C. E. Hubbard for his help with the grasses, which have accounted for so many of the species, and Mr C. C. Townsend whose wide knowledge of the alien flora has been most valuable. My botanist friends will realise how much my limited work in recent years on the flora of Bedfordshire has been a joint exploration with my wife.

LIST OF SPECIES

PAPAVERACEAE

§ *Glaucium corniculatum* (L.) Rudolph. Flitwick, 1959 (LTN). Recorded earlier (*c*. 1910) as a casual.

Cruciferae

§ *Erucaria hispanica* (L.) Druce. Sundon Dump, 1963 (LTN); Broom, 1965 (LO).
§ *Lepidium divaricatum* Soland. Flitwick, 1958 (K), C. C. Townsend, 1963 (LTN).
Matthiola sinuata (L.) R. Br. Roadside, Clophill, 1965 (LTN), M. McCallum Webster.
§ *Sisymbrium erysimoides* Desf. Flitwick, 1954 (LTN).

Caryophyllaceae

Silene dichotoma Ehrh. Streatley, 1959 (LTN), W. D. Coales.
§ *S. nocturna* L. var. *brachypetala* (Robill. & Cast.) Vis. Ampthill, 1959 (LTN).
Vaccaria pyramidata Medic. Sundon Dump, 1958 (LTN), G. Elwell. Recorded earlier as a rare casual, now frequent as a bird-seed alien.

Illecebraceae

§ *Herniaria hirsuta* L. (including subsp. *cinerea* (DC.) Loret). Flitwick, 1957 (LTN); Maulden, 1959 (LTN).

Aizoaceae

§ *Galenia africana* L. Ampthill, 1959 (OXF), H. J. M. Bowen, Broom, 1964 (LTN).
§ *Mesembryanthemum crystallinum* L. Shefford, 1956 (LTN).

Amaranthaceae

§ *Alternanthera peploides* (Humb. & Bonpl.) Urban. Maulden, 1967 (LTN).
Amaranthus blitoides S. Wats. Sundon Dump, 1953 (LTN).
§ *A. hybridus* L. subsp. *incurvatus* (Timeroy Brenan var. *cruentus* Mansf. Sundon Dump, 1958 (LTN); Flitwick, 1962 (LO).
§ *A. macrocarpus* Benth. Ampthill, 1959 (OXF), H. J. M. Bowen.
§ *A. mitchellii* Benth. Maulden, 1967 (LO).
§ *A. quitensis* Humb., Bonpl. & Kunth. Flitwick, 1962 (LTN).
§ *A. spinosus* L. Old Warden, 1953 (LO).

Chenopodiaceae

§ *Atriplex suberecta* Verdoorn. Maulden, 1955 (LTN), 1965 (LO).
§ *Bassia birchii* (F. v. Muell.) F. v. Muell. Maulden, 1966 (LO).
§ *Chenopodium ambrosioides* L. Maulden, 1967 (LTN).
§ *C. hircinum* Schrad. Maulden, 1967 (LTN).
§ *C. macrospermum* Hook. f. subsp. *halophilum* (Phil.) Aellen. Mauden, 1964 (LTN).
§ *C. striatum* Roth. Maulden, 1958 (LTN).
§ *C. pratericola* Rydb. var. *thellungianum* Aellen. Maulden, 1967 (LTN).
§ *C. urbicum* L. Maulden, 1958 (LTN). Previously recorded as a casual by J. McLaren, 1864.
§ *C. vulvaria* L. Maulden, 1965 (LTN). The first certain record.
§ *Kochia sieversiana* (Pall.) C. A. Meyer. Maulden, 1967 (LTN).

Phytolaccaceae

§ *Phytolacca octandra* L. Maulden, 1967 (LTN).

Malvaceae

§ *Hibiscus trionum* L. Maulden, 1956 (LTN); Luton Dump, 1967 (LTN).
§ *Lavatera cretica* L. Maulden, 1959 (LTN).
§ *Malvastrum coromandelianum* (L.) Garcke. Flitton, 1959 (LTN).
§ *M. multicaule* (Schlecht.) Britton. Maulden, 1966 (LO).
§ *M. spicatum* A. Gray. Maulden, 1959 (LTN).

§ *Pavonia urens* Cav. var. *tomentosa* (Hochst. ex Ulbr.) Brenan. Maulden, 1962 (LO).
§ *Sida cordifolia* L. Maulden, 1959 (LTN).

GERANIACEAE
§ *Erodium chium* (Burm. f.) Willd. Flitwick, 1958 (LO).
§ *E. ciconium* (L.) L'Hérit. Maulden, 1954 (LTN); Ampthill, 1959 (LTN).
§ *E. crinitum* Carolin. Biggleswade, 1945 (LTN), etc. This is a common wool adventive to which most previous records of *E. cygnorum* should be referred.
§ *E. cygnorum* Nees *sensu stricto*. Maulden, 1946 (LTN), 1950 (LO), etc.
§ *E. laciniatum* (Cav.) Willd. Maulden, 1963, grown on, 1965 (BM), M. MCCALLUM WEBSTER.
§ *E. malachoides* (L.) Willd. Flitton, 1954 (LTN).

LEGUMINOSAE
§ *Hedysarum spinosissimum* L. Flitwick, 1959 (LTN).
§ *Lupinus luteus* L. Flitton, 1965 (LO).
§ *Psoralea cinerea* Lindl. Maulden, 1967 (LTN).
§ *Scorpiurus muricatus* L. subsp. *muricatus*. Silsoe Hill, 1958 (LO). Subsp. *subvillosus* (L.) Thell. Maulden, 1954 (LO), 1966 (LTN).
§ *Trifolium cernuum* Brot. Flitton, 1965 (LTN).
§ *T. constantinopolitanum* Ser. Maulden, 1960 (LTN), C. C. TOWNSEND.
§ *T. echinatum* M. Bieb. Flitton, 1965 (LTN).
§ *T. hirtum* All. Maulden, 1967 (LTN).
§ *T. patens* Schreb. Maulden, 1958 (LTN).
§ *T. purpureum* Lois. Flitwick, 1958 (LTN).
§ *T. squamosum* L. Blunham, 1963 (CGE), M. MCCALLUM WEBSTER.
§ *Vicia benghalensis* L. (*V. atropurpurea* Desf.) Sandy, 1951 (LO).
V. lutea L. Sundon Dump, 1953 (LTN). A previous record by McLaren in 1884 referred to *V. hybrida* L.

ROSACEAE
§ *Acaena adscendens* Vahl. Maulden, 1963 (LO).
§ *A. integerrima* Gill. Maulden, 1954 (LTN).

ONAGRACEAE
§ *Oenothera laciniata* Hill. Flitwick, 1959 (LTN); Maulden, 1964 (LTN).

UMBELLIFERAE
§ *Ammi visnaga* Lam. Flitwick, 1958 (LTN).
§ *Apium leptophyllum* (Pers.) F.v. Muell. Old Warden, 1954 (LTN).
Bupleurum lancifolium Hornem. Sundon Dump, 1954 (LTN). This is now frequent as a bird-seed alien.
§ *Caucalis melanantha* (Hochst.) Hiern. Maulden, 1966 (LO).
Cuminum cyminum L. Sundon Dump, 1962 (LTN), G. ELWELL.
§ *Daucus crinitus* Desf. Maulden, 1959 (LTN).
§ *Ridolfia segetum* Moris. Millbrook, 1958 (LTN).
§ *Torilis leptophylla* (L.) Reichb. Shefford, 1957 (E), M. MCCALLUM WEBSTER.

CUCURBITACEAE
§ *Cucumis myriocarpus* Naud. Flitwick, 1957 (LTN).
§ *Ecballium elaterium* (L.) A. Rich. Maulden, 1955 (LTN), H. J. M. BOWEN.

POLYGONACEAE
§ *Fagopyrum tataricum* Gaertn. Flitwick, 1954 (LTN).

§ *Polygonum plebejum* R. Br. Flitwick, 1954 (LTN).
§ *P. senegalense* Meisn. Maulden, 1966 (LO).
§ *Rumex dentatus* subsp. *halacsyi* (Rech.) Rech. f. Maulden, 1954 (LTN).

URTICACEAE
§ *Urtica incisa* Poir. Maulden, 1966 (LTN).

PRIMULACEAE
Lysimachia punctata L. Sundon Dump, 1954 (LTN).

BORAGINACEAE
§ *Echium lycopsis* L. Flitwick, 1957 (LTN); Maulden, 1963 (LTN).
§ *Heliotropium europeum* L. Flitwick, 1956 (LTN).
§ *Lappula echinata* Gilib. Flitwick, 1956 (LTN).

HYDROPHYLLACEAE
Phacelia tanacetifolia Benth. Garden, Bedford, 1964 (LTN), K. E. WEST.

CONVOLVULACEAE
§ *Cuscuta campestris* Yuncker. Flitton, 1955 (LTN); garden, Bedford, 1962.
Ipomoea batatas (L.) Lam. Luton Dump, 1967 (LTN).

SOLANACEAE
§ *Nicotiana occidentalis* Wheeler. Flitwick, 1958 (LTN).
§ *Physalis acutifolia* (Miers) Sandwith. Flitwick, 1958 (K), see Sandwith (1960).
§ *Solanum sisymbrifolium* Lam. Maulden, 1954 (LTN).
§ *S. triflorum* Nutt. Old Warden, 1955 (LTN).

SCROPHULARIACEAE
§ *Verbascum virgatum* Stokes. Flitwick, 1954 (LTN).

VERBENACEAE
§ *Verbena bonariensis* L. Maulden, 1958 (LTN), 1963 (LTN).
§ *V. menthaefolia* Benth. Maulden, 1958 (K), C. C. TOWNSEND, see Townsend (1961).
§ *V. supina* L. Maulden, 1966 (LO).

LABIATAE
§ *Dracocephalum parviflorum* Nutt. Maulden, 1963 (K), M. MCCALLUM WEBSTER.
§ *Salvia reflexa* Hornem. Old Warden, (LTN). Frequent as a bird-seed alien.

RUBIACEAE
§ *Galium setaceum* Lam. Flitwick, 1957 (LTN).

COMPOSITAE
§ *Acanthospermum australe* (Loee.) Kuntze. Maulden, 1954 (LTN).
§ *Achillea nobilis* L. Maulden, 1966 (LO). Previously recorded (*c.* 1884) as a casual.
§ *Artemisia afra* Jacq. Biggleswade, 1951, grown on, 1952 (LTN).
§ *A. dracunculus* L. Shefford, 1956 (LO).
§ *Berkheya heterophylla* (Thunb.) O. Hoffm. Maulden, 1965 (LO).
§ *Bidens vulgata* Greene. Maulden, 1958 (LO); Silsoe, 1958 (LO).
§ *Carduus argentatus* L. Maulden, 1954 (LTN).
§ *C. pycnocephalus* L. Maulden, 1965 (LTN).

§ *Centaurea diluta* Ait. f. Flitton, 1957 (LTN). This is also frequent as a bird-seed alien.
§ *Chrysanthemum coronarium* L. Flitwick, 1956 (LTN).
§ *Chrysocoma tenuifolia* Berg. Flitwick, 1957 (LO); Maulden, 1964 (LO).
§ *Cichorium pumilum* Jacq. Flitwick, 1957 (LTN).
§ *Cineraria lyratus* DC. Maulden, 1965 (LTN).
§ *Cryptostemma calendulacea* (L.) R. Br. Maulden, 1958 (LTN).
§ *Erigeron floribundus* Humb., Bonpl. & Kunth. Maulden 1963, grown on, 1964 (LTN), M. McCallum Webster.
Guizotia abyssinica (L.f.) Cass. Sundon Dump, 1953 (LTN). This is now frequent as a bird-seed alien.
§ *Helichrysum odoratissimum* (L.) Less. Maulden, 1966, grown on, 1967 (LO).
§ *Hypochoeris glabra* L. Maulden, 1958 (LTN), 1964 (LTN). This had been previously recorded as a rare native.
§ *Ifloga verticillata* (L.f.) Fenzl. Maulden, 1965 (LO).
§ *Inula graveolens* (L.) Desf. Maulden, 1954 (LTN); Flitwick, 1959 (LTN).
§ *Pentzia grandiflora* (Fenzl.) Hutch. Maulden, 1964 (LO).
§ *Senecio bipinnatisectis* Belcher. Maulden, 1959 (LTN), C. C. Townsend.
§ *S. pterophorus* DC. Ampthill, 1959 (LO), H. J. M. Bowen.
§ *Sigesbeckia microcephala* DC. Maulden, 1962 (LTN), 1964 (LTN), det. R. K. Brummitt.
§ *S. orientalis* L. Flitwick, 1954 (LTN) det. R. K. Brummitt.
§ *Solvia anthemifolia* (Juss.) R. Br. Maulden, 1968.
§ *Verbesina encelioides* (Cav.) A. Gray. Maulden, 1956 (LTN).
§ *Vittadinia triloba* (Gaudich.) DC. Flitwick, 1958 (LTN); Maulden, 1965 (LTN).
§ *Xanthium ambrosoides* Hook. & Arn. Maulden, 1954 (LTN).

Liliaceae

§ *Asphodelus fistulosus* L. Maulden, 1967.

Juncaceae

§ *Juncus australis* Hook. f. Eaton Socon, 1946 (LTN).
§ *J. gregiflorus* L. A. S. Johnson. Eaton Socon, 1945 (LTN).
§ *J. procerus* E. Mey. Eaton Socon, 1947 (LTN).
§ *J. sarophorus* L. A. S. Johnson. Eaton Socon, 1946 (LTN).
§ *J. usitatus* L. A. S. Johnson. Wyboston, 1946 (LTN).
§ *J. vaginatus* R. Br. Eaton Socon, 1946 (LTN).

The Australian species *J. pallidus* R. Br. was recorded in the *Flora* with a note that others awaited determination. Mr. Johnson, who is making a revision of the Australasian *Junci*, has examined my material and the result of his yet incomplete survey so far as it affects the Bedfordshire material is shown above. A key showing the differences between the various species, except *J. vaginatus*, and British species in the Section Genuini is given in Edgar (1964).

Cyperaceae

§ *Carex inversa* R. Br. Maulden, 1966 (LTN).
§ *Cyperus eragrostis* Lam. Maulden, 1966, grown on, 1967 (LO).
C. esculentus L. Luton Dump, 1955 (LTN), J. Harper and J. D. Stephen.
C. rotundus L. Sundon Dump, 1953 (LTN).

Gramineae

§ *Agropyron scabrum* (R. Br.) Beauv. Maulden, 1964 (LTN).
§ *Agrostis semiverticillata* (Forsk.) C. Chr. Ampthill, 1965 (LTN).
§ *Amphibromus neesii* Steud. Old Warden, 1954 (LTN).

§ *Aristida benthamii* Henrard. Maulden, 1964 (LO).
§ *A. congesta* Roem. & Schult. Maulden, 1964 (LO).
§ *Arrhenatherum album* (Vahl) W. D. Clayton. Maulden, 1964 (LTN).
Avena strigosa Schreb. Sundon Dump, 1958 (LTN), M. McCallum Webster.
§ *Briza maxima* L. Flitwick, 1959 (LTN).
§ *B. minor* L. Maulden, 1965 (LTN), M. McCallum Webster.
§ *Bromus carinatus* Hook. & Arn. Maulden, 1958 (LO).
§ *B. fasciculatus* Presl. Maulden, 1964 (Herb. Bowen), H. J. M. Bowen.
§ *B. japonicus* Thunb. Flitwick, 1955 (LTN); Maulden, 1965 (LTN).
§ *B. rigidus* Roth. Flitwick, 1956 (LTN).
§ *B. scoparius* L. Maulden, 1958 (K), C. C. Townsend, 1959 (LTN).
§ *Cenchrus ciliaris* L. Maulden, 1967 (LTN).
§ *Chloris divaricata* R. Br. Maulden, 1957 (LO), 1964 (LTN).
§ *Cynodon dactylon* (L.) Pers. Flitwick, 1959 (LO).
§ *C. incompletus* Nees. Maulden, 1959 (LTN).
§ *Danthonia caespitosa* Gaud. Beeston, 1950 (LO).
§ *D. penicillata* (Labill.) F.v. Muell. Flitwick, 1957 (LO).
§ *Dichanthium sericeum* (R. Br.) A. Camus., Maulden, 1958 (LTN).
§ *Digitaria adscendens* (Humb., Bonpl. & Kunth) Henrard. Flitwick, 1949 (LO); Maulden, 1967 (K).
Echinochloa colonum (L.) Link. Sundon Dump, 1957 (LTN). A bird-seed alien.
E. frumentacea Link. Sundon Dump, 1958 (LTN). This is now frequent as a bird-seed alien.
§ *Ehrharta longiflora* Sm. Maulden, 1957 (LO, Herb. Bowen), H. J. M. Bowen.
§ *Eleusine africana* O'Byrne. Flitwick, 1949 (K); Old Warden, 1952 (LTN). The earlier records of *E. indica* (L.) Gaertn. should be referred to this.
§ *Eragrostis mexicana* (Hornem.) Link. Maulden, 1967 (K).
§ *E. poaeoides* Beauv. Maulden, 1959 (LTN).
§ *E. trachycarpa* Domin. Flitwick, 1964 (LTN).
§ *Eriochloa pseudo-acrotricha* (Stapf.) Hubbard. Maulden, 1959 (LTN).
§ *Gastridium phleoides* (Nees & Meyer) Hubbard. Ampthill, 1962 (LO); Maulden, 1964 (LO, LTN).
§ *G. ventricosum* (Govan) Schinz & Thell. Maulden, 1962 (LTN).
§ *Glyceria multiflora* Steud. Maulden, 1954 (K, LO).
§ *G. spicata* Guss. Shefford, 1956 (LO).
§ *Helictotrichon turgidulum* (Stapf.) Schweicherdt. Maulden, 1964 (LTN).
§ *Hordeum flexuosum* Nees ex Steud. Maulden, 1962 (LTN).
§ *H. glaucum* Steud. Flitwick, 1953 (LTN).
§ *H. procera* Nevski. Maulden, 1964 (LO).
§ *H. pubiflorum* Hook. f. Flitton, 1962 (LTN), 1963 (LTN).
§ *H. pusillum* Nutt. Flitwick, 1954 (LTN).
§ *Lamarckia aurea* (L.) Moench. Ampthill, 1959 (LTN).
§ *Lolium loliaceum* (Bory & Chaub.) Hand.-Mazz. Maulden, 1954 (LTN).
§ *L. rigidum* Gaud. Maulden, 1954 (LTN).
§ *Microleana stipoides* R. Br. Maulden, 1959 (LTN).
§ *Monerma cylindrica* (Willd.) Coss. & Dur. Maulden, 1961 (LTN).
§ *Nassella trichotoma* (Nees) Hack. Maulden, 1954, grown on, 1955 (LTN), M. McCallum Webster.
§ *Oryzopsis miliacea* (L.) Benth. & Hook. Flitwick, 1957 (K); Flitton, 1967 (LO).
§ *Panicum capillare* L. Flitwick, 1955 (LTN).
§ *P. decompositum* R. Br. Maulden, 1966 (LO).
§ *P. prolutum* F. v. Muell. Maulden, 1965 (LO).
§ *P. subalbidum* Kunth. Flitton, 1955 (LO).
§ *Paspalidium jubiflorum* (Trin.) Hughes. Flitton, 1957 (LTN).
§ *Paspalum dilatatum* Poir. Maulden, 1959 (LTN).

§ *Phalaris brachystachys* Link. Ampthill, 1959 (OXF), H. J. M. Bowen.
§ *P. tuberosa* L. Ampthill, 1962 (LO, LTN). Previously recorded as a relic of cultivation.
§ *Schismus barbatus* (L.) Thell. Maulden, 1958 (LTN).
§ *Schmidtia kalahariensis* Stent. Flitwick, 1959 (LTN).
§ *Setaria geniculata* (Lam.) Beauv. Maulden, 1959 (LTN); Luton Dump, 1967 (LTN).
§ *S. lutescens* (Weigel) Hubbard. Clifton, 1953 (LTN).
§ *Sporobolus africanus* (Poir.) Robyns & Tournay. Flitwick, 1958 (LTN).
§ *Stipa aristoglumis* F. v. Muell. Maulden, 1964 (LO).
§ *S. dusenii* Hitch. Ampthill, 1962 (LO).
§ *S. hyalina* Nees. Maulden, 1964 (LTN), 1965 (LTN).
§ *S. neesiana* Trin. & Rupr. Maulden, 1964 (LTN).
§ *S. tortilis* Desf. Maulden, 1959 (LTN).
§ *S. verticillata* Nees. Flitton, 1965 (LTN); Maulden, 1967 (LO).
§ *Vulpia australis* (Nees ex Steud.) Blom. Maulden, 1964 (K, LO).
§ *V. geniculata* (L.) Link. Flitwick, 1957 (K, LTN, LO).

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NOTES ON THE FLORA AND VEGETATION OF FOULA, ZETLAND (V.C. 112)

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INTRODUCTION

The island of Foula (Fig. 1), lying 16 miles (26 km.) west of Walls, the nearest point on Shetland Mainland, and 46 miles (78 km.) north-west of Fair Isle, is the most westerly of the Shetland Islands and the most isolated inhabited island within the British Isles. Its isolation has been an important factor in the study of the island by botanists as the absence of any regular boat services makes short, inexpensive trips impossible. The island's rugged appearance with Old Red Sandstone cliffs rising to 1,220 ft. (366 m.) at The Kame and the abrupt peaks of The Sneug (1,373 ft. (412 m.)—the second highest hill in Shetland), Hamnafjeld (1,126 ft. (337 m.)) and The Noup (803 ft. (240 m.)) has lured only 18 botanists to this 11.85 square miles (3069 hect.) within the last 200 years.

The first botanist to visit Foula was the Rev. G. Low in 1774 (Low, 1879) but he recorded little apart from two species of lichens (Hawksworth, 1967a). The famous botanist W. H. Beeby did not neglect this island during his extensive studies of the Scottish flora, visiting it in 1887 (Beeby, 1888; and herbarium preserved at the South London Botanical Institute, SLBI) and his was the first significant contribution to our knowledge of the island's flora. Specimens of *Euphrasia* collected by Beeby are the holotype of *E. foulaensis* Wettst., (Wettstein, 1896, p. 140). Graves (1899) notes *Hymenophyllum wilsonii* Hook. on Foula. F. J. Lewis noted a number of interesting montane species in 1909 while engaged on studies of the peat deposits (Lewis, 1911) but specimens supporting his records have not been traced. Druce, in the Flora Zetlandica (Druce, 1922, 1925), includes only the records of Beeby. J. Gladstone, following up his important work on St. Kilda, visited Foula in 1928; his extensive collections and notes (preserved at the Royal Botanic Gardens, Kew, K) formed the basis of the paper by Turrill (1929) which lists 137 species of vascular plants.

A lull in botanical studies followed, interrupted only by the visit of Hampus Arnell (Uppsala, Sweden) in *c.* 1952 to collect bryophytes, until K. G. Messenger and J. G. Urquhart visited the island in 1956 and 1957 respectively (Messenger and Urquhart, 1959). Their collections (preserved in the herbaria of Uppingham School, Rutland, UPR, and the Royal Botanic Garden, Edinburgh, EDIN, respectively) added a further 55 species to the list. Professor Gunnar Degelius (Göteborg, Sweden) visited the island in 1958 to collect lichens. Mrs S. C. Gear (née Holbourn), who now lives on Foula, made collections in 1959 and 1960 (which are preserved in EDIN) which added another 30 to the number of published species from the island (Holbourn, 1961).

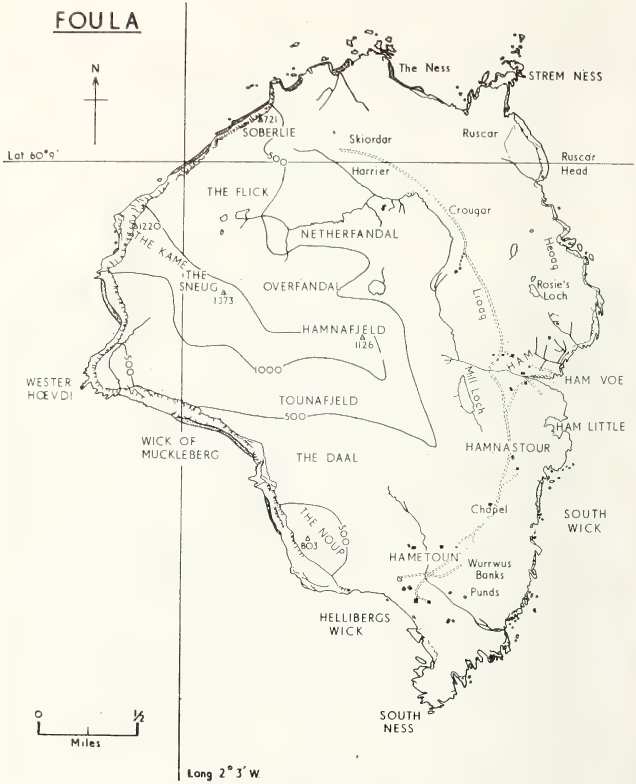

FIGURE 1. Foula. (Reprinted with the permission of the *Lichenologist.*)

In addition the island has been visited by a further eight collectors: W. Scott in 1959, 1962 and 1965; J. Ogden in 1961; R. Oxlade in 1958; T. Hooker in 1963; G. Wynne in 1964; the author in 1965 and 1966; and Miss C. Mills and Mrs S. Leitch in 1966.

It is the purpose of the present paper to summarise the additions and corrections to the vascular plant flora made necessary as a result of field work by these collectors.

ADDITIONS AND CORRECTIONS

This list is arranged according to Dandy (1958). The names of some species have been altered from those in Dandy in accordance with modern nomenclatural practice. The following abbreviations, in addition to those already defined above, have been used:—

*	first record for the island.
†	extinct.
?	field record not supported by specimen and in need of confirmation.
c	confirmation of a pre-1930 record.
BM	herbarium of the British Museum (Natural History).
WS	herbarium of Walter Scott (Scalloway, Shetland).
LTR	herbarium of the Botanical Laboratories, School of Biology, University of Leicester.

* 1/1. Huperzia selago (L.) Bernh. ex Schrank & Mart. (*Lycopodium selago* L.) The Sneug, Beeby 1887 (*omissa* in Turrill, 1929) SLBI; The Kame, W. Scott 1965; above Harrier, Mills & Leitch 1966 LTR; subfossil spores in peat deposits, The Noup, Hawksworth 1966.

*?1/5. Diphasium alpinum (L.) Rothm. (*Lycopodium alpinum* L.) R. Oxlade 1958; subfossil spores in peat deposits, The Noup, Hawksworth 1966.

c 7/2. Hymenophyllum wilsonii Hook. This plant is common in the bases of *Luzula sylvatica* and *Juncus squarrosus* and on damp rocks on The Sneug—Hamnafjeld ridge. J. Ogden 1961; Hawksworth 1965, 1966 LTR; Mills & Leitch 1966. Although published by Graves (1899) this species is omitted by Turrill (1929) and Messenger and Urquhart (1959).

* 29/1. Ophioglossum azoricum C. Presl. (*O. vulgatum* subsp. *ambiguum* (Coss. & Germ.) E. F. Warb.) A small patch at Bankwell, J. Ogden 1961 WS; a single plant in grassland by Ham Burn below Leirabeck Croft, Hawksworth 1965.

* 46/2. Ranunculus repens L. J. Ogden 1961; locally common near Gravins, Hawksworth 1965, 1966.

*?97/4. Cardamine flexuosa With. J. Ogden 1961.

* 123/13. Silene dioica (L.) Clairv. subsp. zetlandica (Compton) Tutin. This robust densely hairy taxon is the only form of this species on Foula. It is frequently grown in gardens and occurs around crofts but has not been seen in its natural habitat of sea cliffs (Scott, 1966) on Foula. Hawksworth 1965 LTR.

?123/14. Silene alba (Mill.) E. H. L. Krause. There is no real evidence for this species on Foula. All white flowered specimens of *Silene* sect. *Melandriformes* Boiss. (including that of Gladstone in K) appear to be white-flowered forms of *S. dioica* subsp. *zetlandica*.

* 220/3. (10). Alchemilla glabra Neygenf. Road in front of Post Office, J. Ogden 1961.

* 225/p. Rosa palustris Marsh. Introduced, W. Scott 1959 WS (Scott, 1960).

* 259/–. Myriophyllum sp. A poor specimen indeterminable to the specific level, Mill Loch, Mills & Leitch 1966.

* 320/1(b). Polygonum boreale (Lange) Small. A weed of cultivation, W. Scott 1962. A common species of this habitat on Shetland Mainland (cf. Styles, 1962) and probably the species to which the *P. aviculare* recorded by Turrill (1929) should be referred.

*?320/8. Polygonum amphibium L. J. Ogden 1961.

†333/1. Myrica gale L. Abundant pollen in peat deposits near Hamnastour, Hawksworth 1966.

†335/–. Betula sp. Macroscopic remains of wood which belong to this genus occur in the lower layers of the peat at Hamnastour and Netherfandal. A single seed referable to *Betula pubescens* Ehrh. was found preserved in the peat at Netherfandal, Hawksworth 1966.

†336/1. Alnus glutinosa (L.) Gaertn. Pollen occurs throughout the peat deposits, and wood, collected by A. Holbourn from Hamnastour in 1967, confirms that this species was once present on Foula, Hawksworth 1966.

†346/1. Loiseleuria procumbens (L.) Desv. Best regarded as extinct since it has not been re-collected since Lewis noted it in 1909.

†355/1. Arctous alpinus (L.) Nied. Best regarded as extinct since it has not been re-collected since Lewis noted it in 1909.

* 357/4. Erica cinerea L. J. Ogden 1961; frequent on dry heath near Punds, Hawksworth 1966.

435/1. Euphrasia officinalis L. *sensu lato*. All records of this genus, which is exceptionally difficult on Foula, are summarised in Table 1. Four species are added to the flora: *E. micrantha Reichb. Wurrwus Banks, Hawksworth 1966; South Ness, Mills & Leitch 1966; *E. confusa Pugsl. Ham Voe, W. Scott 1959; Blobbersburn and Ham Voe, Hawksworth 1966; *E. marshallii Pugsl. Wurrwus Banks, Hawksworth 1966; *E. arctica Lange ex Rostrup (all earlier records of *E. borealis* are this species, for nomenclature see Sell & Yeo, 1967; the robust hairy form of this species, *E. borealis* var. *zetlandica* Pugsl., was collected by Hooker 1963); and two hybrids *E. marshallii × arctica Ham, Hawksworth 1965; and cf. *E. marshallii × foulaensis, South Ness, Mills & Leitch 1966. A specimen collected from The Flick by the author in 1965

TABLE 1. SUMMARY OF RECORDS OF THE GENUS *EUPHRASIA* FROM FOULA.

HYBRIDS		BREVIPILAE		NEMOROSAE			LATIFOLIAE				
marshallii × foulaensis	marshallii × arctica	brevipila	arctica	nemorosa	marshallii	confusa	scottica	micrantha	frigida	foulaensis	
										ht	1887 Beeby
			●							●	1928 Gladstone
			●	●						●	1956 Messenger
		s							s		1957 Urquhart
						●					1959 Scott
	●		●			cf					1963 Hooker
	●		●				cf	●		●	1965 Hawksworth
			●		●	●		●		●	1966 Hawksworth
cf								●		●	1966 Mills & Leitch

● determination correct ht holotype
cf „ tentative specimen
s „ suspect

may be *?E. SCOTTICA Wettst. but more material is needed to confirm this. All specimens of this genus collected by MILLS & LEITCH and the author are in LTR.

The species of *Euphrasia* on Foula are divided in respect to their ecological preferences. *E.* cf. *scottica* (to which Urquhart's specimen of '*E. frigida*' probably belongs) appears to be confined to the *Eriophorum* bog between The Flick and Blobbersburn. *E. micrantha*, *E. foulaensis* and *E. marshallii* are found in short turf on peat or mor in the lower parts of the island (below 450 ft. (137 m.)). *E. confusa* and *E. arctica* (*E. borealis* auct. mult.) occur in tall grassland in damp areas near Ham and Hametoun (*E. brevipila* of Urquhart is *E. arctica*). *E. nemorosa* is a frequent species of short turf on Shetland Mainland and should be searched for on Foula since it has not been re-collected since Messenger found it in 1956.

* 400/9. MYOSOTIS DISCOLOR Pers. W. SCOTT 1959.

* 445/3. MENTHA × GENTILIS L. Messenger's *M. spicata* and Urquhart's *M.* × *smithiana* both refer to this hybrid.

*?491/3. LONICERA PERICLYMENUM L. J. OGDEN 1961.

* 544/2. CENTAUREA MONTANA L. Introduced, Ham Burn, W. SCOTT 1962 WS.

*?574/2. TRIGLOCHIN MARITIMA L. J. OGDEN 1961.

* 577/1. POTAMOGETON NATANS L. Mill Loch, MILLS & LEITCH 1966 BM.

* 577/6 × 9. POTAMOGETON × NITENS Weber. (*P. gramineus* × *perfoliatus*). Flick Lochs, MILLS & LEITCH 1966 BM.

* 577/9. POTAMOGETON PERFOLIATUS L. Mill Loch, MILLS & LEITCH 1966 BM.

* 593/2. LILIUM PYRENAICUM Gouan. Introduced, by Ham Burn, W. SCOTT 1962; introduced, Manse Garden, HAWKSWORTH 1966.

* 605/18. JUNCUS ACUTIFLORUS Ehrh. ex Hoffm. J. OGDEN 1961; on an old pile of peats, Hamnastour, HAWKSWORTH 1966.

*?605/22. JUNCUS KOCHII F. W. Schultz. J. OGDEN 1961.

* 606/1. LUZULA PILOSA (L.) Willd. The Sneug, BEEBY 1887 SLBI (*omissa* in Turrill, 1929); J. OGDEN 1961; MILLS & LEITCH 1966 LTR.

* 636/1. GYMNADENIA CONOPSEA (L.) R. Br. On peat, near Crougar, HAWKSWORTH 1965 LTR (Hawksworth, 1967b); by Daal Burn Mill, Hametoun, HAWKSWORTH 1966. This plant is only known from five other localities in Shetland; three of these are in association with serpentine debris on Unst.

* 663/26. CAREX PANICEA L. Ham, W. SCOTT 1959.

* 671/2. LOLIUM MULTIFLORUM Lam. Introduced with corn, grassland, Ham, HAWKSWORTH 1965 LTR.

*?673/1. PUCCINELLIA MARITIMA (Huds.) Parl. J. OGDEN 1961.

* 673/c. PUCCINELLIA CAPILLARIS (Liljebl.) Jensen, *Fl. Neerl.*, **1**, 2 (1951) p. 69 *ad not.* (*Festuca capillaris* Liljebl., *Sv. Fl.*, ed. 2 (1798) p. 48; *P. retroflexa* auct. mult. non Curt.; for details of synonomy see Tzel, *Fl. Arct. URSS* **2** (1964) p. 201). Ham Voe, W. SCOTT 1962 WS; T. HOOKER 1963 K. This species is widespread in Shetland and Orkney where it probably replaces *P. distans* (Jacq.) Parl. It is distinguished from *P. distans* and *P. maritima* on the size of its lemmas and anthers and is common in northern and central Scandinavia.

*?676/4. POA ALPINA L. This record, made by Lewis in 1909 (Lewis, 1911, p. 805, as *Poa alpina* var. *vivipara*) is probably an error for *Festuca vivipara* but as Lewis mentions *F. ovina* var. *vivipara* on the following page (p. 806) in the absence of material the record should not be ignored. Lewis was an eminent botanist and a

few of his rarities from Foula have been re-discovered within the last decade (e.g. *Polygonum viviparum* L. by Holbourn, 1961).

* 679/1. Cynosurus cristatus L. Near Gravins, J. Ogden 1961; frequent in grassland, Ham, Hawksworth 1966. Probably introduced with corn.

†692/3. Avena strigosa Schreb. Once cultivated on Foula, it has now died out in its locality at Harrier.

NOTES ON PARTICULAR SPECIES

8/1. Pteridum aquilinum (L.) Kuhn. Since Turrill (1929) reported 'Quite recently an exceptionally hard winter is said to have killed it off', this plant re-appeared at Quivrigill only to be killed off again in the severe winter of 1947 (Messenger & Urquhart, 1959). This plant is still extinct on Foula which must be at the climatic limit for this species. Remains of its rhizomes were noted by the author in the upper layers of the peat deposits at Quivrigill, but it never appears to have been an ecologically important plant on Foula as only occasional spores have been encountered in pollen analyses.

34/1(b). Juniperus communis L. subsp. nana Syme. This species, which Lewis (1911) claimed he found as a distinct layer in all the peat profiles he examined, was noted by the author in peat at Flick Lochs and Hamnastour. No pollen was found in association with the macroscopic remains so the extinct Foula population is tentatively referred to this subspecies. Specimens of this taxon from Collafirth Hill, North Mainland, Hawksworth 1966 LTR, are sterile and dwarf, indicating that they too are approaching extinction. Grazing by sheep appears to be a major factor in the decline of this species in Shetland (Spence, 1960).

46/1. Ranunculus acris L. The Foula material belongs to subsp. *acris* but some specimens from Foula cultivated at Leicester University had peculiarly long rootstocks, which were retained in cultivation, and approached the rhizomes of subsp. *friesianus* (Jordan) Rouy & Fouc. in this character (Coles, 1968). These long rootstocks were noted in the Shetland forms of this species by Drabble (1931) who named them *R. acer* var. *friesianus* f. *villosus* Drabble.

267/1. Chamaepericlymenum suecicum (L.) Aschers. & Graebn. This species was first reported from The Sneug by Beeby (1888) and Turrill (1929) and was also seen there by W. Scott in 1959 and 1965. Stunted plants are also locally abundant on the ridge between Soberlie Hill and The Kame, Mills & Leitch 1966 LTR (sterile).

356/1. Calluna vulgaris (L.) Hull. Is abundant on the lower parts of the island. All plants are the glaucous and slightly hairy var. *hirsuta* S. F. Gray which Gimingham (1960) states is the more frequent form of the species in maritime situations. This species now flowers and sets seed abundantly although Turrill (1929) remarked that it '. . . is said to have decreased and to flower less than formerly.'

364/1. Empetrum nigrum L. Turrill (1929) noted that 'The islanders say that it has descended to the low ground and that it has more berries than it used to have.' On the low ground today it is phytosociologically a very important plant in areas cleared of peat by cutting, or where drainage has been increased as a result of other anthropogenic activities. The undisturbed habitat of this species on the summits of Ronas Hill and Collafirth Hill, North Mainland, is open, well-drained soils resembling those revealed after the removal of peat by man, at lower altitudes, on Foula. Throughout Shetland *Empetrum nigrum* occurs in damp heaths (mainly '*Calluna-Erica tetralix* heaths rich in *Empetrum nigrum*' (Gimingham, *op. cit.*)) but only becomes dominant in open well-drained habitats.

?†364/2. EMPETRUM HERMAPHRODITUM Hagerup. Two pollen grains of this species were found in silt below the peat deposits at Lioag and one was found in peat at The Noup, but these may be contaminants from Shetland Mainland, and cannot be taken as definite evidence of the former presence of this species on Foula. Extensive searches for *E. hermaphroditum* on Foula in 1965 and 1966 failed to discover it. Its apparent absence is especially interesting in view of the heaths which this species dominates locally on Shetland Mainland (Spence, 1960).

LIFE FORM ANALYSIS

Turrill (1929) published a life-form analysis of the island's flora, and in view of the 102 species added to the list since 1928, it was thought desirable to see how these additions affect the percentages of the different life-forms present. The results of this analysis are given in Table 2. From this table, which excludes extinct species and the 'microspecies' of *Euphrasia officinalis* L. *s.l.*, it is seen that the only marked percentage change is in the number of phanerophytes and that this is due almost entirely to introductions by man. Hydrophytes are included with the hemi-cryptophytes in both cases.

TABLE 2. LIFE FORM ANALYSIS (see text for explanation; figures in brackets are post- 1928 introductions).

Year	Phanerophytes	Chamaephytes	Hemicryptophytes	Geophytes	Therophytes	Total number of species
1928	2	13	86	10	26	137
	%1·4	9·5	63·8	7·3	19·0	
1966	2(+8)	22(+2)	136(+10)	13	22(+23)	239
	%4·2	10·2	61·0	5·4	19·2	

The hemicryptophytes are the most numerous group, as is to be expected in any British flora, but the high frequency of chamaephytes is interesting. Turrill explained the frequency of chamaephytes as to be expected considering the latitude of Foula (Lat. 60° 06′–09′ N) and regarded most of the therophytes as introduced.

THE MAIN PLANT ASSOCIATIONS

As a result of the tables and descriptions given in the monographs of McVean & Ratcliffe (1962) and Burnett (1964) it has been possible to recognise a number of distinct plant communities on Foula:—

1. PLANTAGO SWARDS (Gimingham, in Burnett, 1964). These predominate on cliff tops all round the island. *Campylopus atrovirens* De Not. and *Parmelia omphalodes* (L.) Ach. are often abundant between the plants of *Plantago coronopus*, *P. maritima* and *Armeria maritima*.

2. ATRIPLEX GLABRIUSCULA-SILENE MARTIMA-TRIPLEUROSPERMUM MARITIMUM STANDS ON PEBBLE BEACHES WITH A MATRIX OF 'WRACK' AND SAND (Gimingham, *op. cit.*). A rare community on Foula but occurring where habitats are suitable as at Boulder Beach, near The Ness.

3. CALLUNA-ERICA TETRALIX HEATHS RICH IN EMPETRUM NIGRUM (Gimingham, *op. cit.*). A common community on low lying areas which have been cleared of peat. On Foula it has relatively small amounts of *Sphagnum* (the most important species of which are *S. plumulosum* Röll. and *S. cuspidatum* Ehrh. ex Hoffm. emend.). Within it a complete spectrum from *Empetrum nigrum* dominance to *Calluna vulgaris-Erica tetralix* co-dominance is seen. Gimingham states that the cycle from the co-dominant vegetation and back to it via an *Empetrum* peak, takes 3 to 5 years.

4. CALLUNA-TRICHOPHORUM BOG (Ratcliffe, in Burnett, 1964). This occurs locally, usually adjacent to 5 below, as on the summit of Skiordar.

5. MOUNTAIN EMPETRUM-ERIOPHORUM BOG (Ratcliffe, *op. cit.*) This occurs over much of the island below about 800 ft., on moderately well-drained slopes, intergrading with '*Calluna-Trichophorum* bog' in drier facies, and with *Sphagnum*-rich '*Calluna-Erica tetralix* heaths rich in *Empetrum nigrum*' in wetter facies. *Calluna* is characteristic of this community but is often less frequent than *Empetrum nigrum*. The abundance of *Vaccinium uliginosum*, *V. myrtillus*, *Carex bigelowii* and *Cladonia arbuscula* (Wallr.) Rabenh. show that the Foula community belongs to this nodum rather than to the 'Upland *Calluna-Eriophorum* bog' (Ratcliffe, *op. cit.*).

6. FESTUCA-DESCHAMPSIA-(NARDUS) TYPE 3 (King & Nicholson, in Burnett, *op. cit.*). This occurs on well-drained slopes of the hills, as on the west side of The Kame, and locally forms an alternative community to the 'Mountain *Empetrum-Eriophorum* bog'. It was also noted in association with peat cuttings on the southern slopes of Skiordar and Crougar.

7. NARDETUM SUB-ALPINUM (SPECIES POOR) (McVean & Ratcliffe, *op. cit.*) intergrades with 6 and 8. It ascends almost to the summit of The Noup and The Kame.

8. JUNCETUM SQUARROSUM SUB-ALPINUM (SPECIES POOR) (McVean & Ratcliffe, *op. cit.*) is characteristic of the steep eastern slope of Hamnafjeld where it forms an altitudinal zone between the '*Festuca-Deschampsia-*(*Nardus*) type 3' grassland nodum and the '*Luzula sylvatica* grassland nodum'.

9. LUZULA SYLVATICA GRASSLAND NODUM (McVean & Ratcliffe, *op. cit.*) forms the summit vegetation of The Sneug and Hamnafjeld and its presence on Foula agrees with King & Nicholson (in Burnett, *op. cit.*) who state that it occurs "... on hill tops at about 457 m. (1500 ft.) elevation along the Atlantic seaboard.' The slightly lower altitude (950-1,373 ft. (285-412 m.)) of this community on Foula is probably due to the cooler climate of Shetland. Spence (1960) notes the occurrence of similar communities on Hermaness and Sandness Hill, Shetland Mainland, where *Vaccinium uliginosum* appears to be a more important constituent of this community than it is on Foula.

10. CALLUNA-ERIOPHORUM VAGINATUM WET HEATH (Gimingham, *op. cit.*) occurs locally in the marshy area in the bottom of The Daal valley.

11. ELEOCHARIS PALUSTRIS-LITTORELLA (Spence, in Burnett, *op. cit.*). Although aquatic communities are poorly developed in the Foula lochs, probably due to the frequency of waves, this community is present in the south-west corner of Mill Loch where it is relatively sheltered.

12. POTAMOGETON NATANS-JUNCUS FLUITANS SOCIATION (Spence, *op. cit.*) occurs in two sheltered localities: on the north-east and south-east corners of Mill Loch. *P. polygonifolius* replaces *P. natans* in a similar association in the more oligotrophic water of Overfandal Loch.

CHANGES IN THE FLORA AND VEGETATION, 1909-1966

The flora as a whole has not changed drastically during the period in which it has received most study, between 1909 and 1966. The extinction of the arctic-alpine species recorded by Lewis (1911) may be attributable in part to the disappearance of suitable habitats. *Loiseleuria procumbens*, *Arctous alpinus*, *Polygonum viviparum* and *Salix herbacea* are all plants of well drained open habitats and were noted by Lewis '. . . on the higher hills above 1,000 feet.' This part of the island, The Sneug-Hamnafjeld-Kame ridge, is now occupied by a '*Luzula sylvatica* grassland nodum' as described above, which is a closed, mor-producing community with poor drainage and little space between the tussocks of *Luzula* and *Juncus* available for colonisation by other species. If Lewis's records of *Loiseleuria* and *Arctous* are authentic, as the rediscovery of *Polygonum viviparum* '. . . on top of Sneug, and Hamnafjeld' (Holbourn, 1961) might suggest, their loss may be attributable to the maturation of the '*Luzula sylvatica* grassland nodum'. Lewis does not mention *L. sylvatica* in his discussion of the general vegetation of Foula which is surprising in view of the present frequency of this species on the island's summits. He also notes *Salix herbacea* as 'being plentiful' but this species is now largely restricted to rock crevices on The Sneug and Hamnafjeld suggesting that it has decreased in frequency since Lewis found it in 1909. The extinction of *Pteridium aquilinum* supports the view that phytosociological changes rather than climatic ameliorations may have governed the disappearance of *Loiseleuria procumbens* and *Arctous alpinus* from the island's flora.

The increased luxuriance of *Calluna vulgaris* and *Empetrum nigrum* since Gladstone visited the island in 1928 appears to be due to an extension of the heathland communities (the '*Calluna-Erica tetralix* heaths rich in *Empetrum nigrum*' and the '*Calluna-Trichophorum* bogs') into areas which have since been cleared of peat by man. The sandy podsolised stony soil which underlies the peat provides an ideal habitat for *Calluna* and *Empetrum* and so explains both the extension of these species and their increased luxuriance. Lewis stated that the vegetation of one area which had been cleared of peat 'more than 150 years ago' (i.e. prior to about 1759) consisted of '*Calluna vulgaris*, *Nardus stricta*, *Juncus squarrosus*, *Festuca ovina* var. *vivipara*, *Empetrum nigrum*, *Potentilla tormentilla*, with *Viola palustris*, *Hydrocotyle vulgaris* and a small quantity of *Sphagnum* in damper places.' This species list suggests the '*Calluna-Erica tetralix* heaths rich in *Empetrum nigrum*', which still occur in the area studied by Lewis at the eastern end of The Daal, indicating that once established this community is relatively stable in this type of habitat.

The only other notable change in the island's flora during this period has been the continued introduction of species by man, both accidentally and for cultivation, as in the cases of *Cynosurus cristatus* and *Lilium pyrenaicum* respectively. The addition to the flora of 102 species since 1928 includes 43 introductions (see Table 2) most of which were accidentally brought in with corn. As the purity of marketed grass seed increases the number of accidental introductions may therefore be expected to decrease. Turrill (1929) regarded 24 species as probable introductions so that, of the 239 species known to occur on the island in 1966, 67 (28%) are introduced.

The islanders now grow the hardy cultivated varieties of *Avena sativa* instead of *A. strigosa*, which was the main crop in the early decades of the present century, and this latter species has now become extinct due to this change in agricultural practice.

The flora of the island's lochs is still in need of further extensive investigation, as is indicated by the discovery of *Myriophyllum* sp., *Potamogeton natans*, *P.* × *nitens* and *P. perfoliatus*, before they can be considered at least as well known as the rest of the island's flora.

ACKNOWLEDGMENTS

I am indebted to Dr G. Halliday, Professor T. G. Tutin, Mr J. E. Dandy (*Potamogeton*) and Dr P. F. Yeo (*Euphrasia*) for their assistance with the determination of specimens and to Mr W. Scott for his valuable comments on the original manuscript. I am also grateful to A. Holbourn and the Brathay Exploration Group who made the author's expeditions practicable and to the various collectors mentioned for permission to include previously unpublished records.

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VARIATION WITHIN *CENTAUREA NIGRA* L.

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INTRODUCTION

A great deal of information concerning *Centaurea nigra* is contained in the work of Marsden-Jones & Turrill (1954), but the general picture which they give is not a very clear one. In the second edition of Clapham, Tutin & Warburg (1962), *C. nigra* is split into subsp. *nigra* and subsp. *nemoralis* (Jord.) Gugl., although it is admitted that intermediates between these two subspecies often occur. A class exercise was devised at the Botany School in Cambridge to test the possibility of distinguishing between these two subspecies in Cambridgeshire and to attempt to assess the extent of the variation between topodemes of *C. nigra*. The results of this exercise are summarised here in the hope that botanists in other parts of the country may be stimulated to look at topodemes of *C. nigra* in their areas.

The supposed differences between subspp. *nigra* and *nemoralis* may be summarised as follows:

	subsp. *nigra*	subsp. *nemoralis*
1.	Stem hispid.	Stem woolly.
2.	Leaves broad, sometimes sinuate or lobed.	Leaves narrow, entire.
3.	Stem much swollen below heads.	Stem little swollen below heads.
4.	Heads hardly longer than broad.	Heads markedly longer than broad.
5.	Bract appendages ± completely concealing the basal parts of the bracts.	Bract appendages not completely concealing the basal parts of the bracts.
6.	Bract disc dark brown.	Bract disc light brown.
7.	Bract disc ovate.	Bract disc linear or lanceolate.
8.	Teeth equalling the bract disc.	Teeth longer than the bract disc.
9.	On heavier and moister soils.	On light calcareous soils.
10.	Commoner in N. Britain.	Commoner in S. Britain.

The list of differences is impressive, but none of the differences is absolute and the two contrasting states for each character are often very difficult to recognise.

VARIATION IN CAMBRIDGESHIRE

Two topodemes in contrasting habitats were chosen for intensive investigation. The Gogs topodeme (north end of Roman Road—Grid reference 52/494545) is on chalk, while the Wicken Fen topodeme (Main Drove—Grid reference 52/555706) is on peat. Over 100 flowering stems were collected from each topodeme and scored for the characters listed. Plants which were not collected were examined in the field and any striking variation was noted. The proportion of open to unopened flowering heads was also recorded in the field.

Both topodemes show a wide range of variation in almost all of the characters scored and there is no character, apart from flowering-time, which can be used to distinguish between them. The Gogs topodeme is considerably later flowering than that at Wicken. On 27 July 1967, 87·2% of the heads at Wicken were in flower but only 12·8% of those on the Gogs. The other characters will be considered individually.

1. HAIRINESS. This character is very difficult to score objectively. Some plants are neither clearly hispid nor clearly woolly. The percentage of woolly plants is somewhat greater in the Gogs sample (51%) than in the Wicken sample (27%).

2. LEAF SHAPE. The variation within topodemes in this character is particularly striking. As leaf shape varies along the stem it is necessary to compare leaves from the same part of the stem. Small plants with unbranched stems tend to have narrow, lanceolate, entire leaves, while large plants with branched stems tend to have broader leaves with sinuate-dentate or laciniate margins.

3. STEM SWELLING. All the plants examined showed some swelling of the stem below the head. This character shows very little measurable variation in Cambridgeshire material.

4. SHAPE OF HEADS. The dimensions of the heads are taken to include all the bracts but exclude the florets. Large plants tend to have larger, broader heads than small plants. This character is difficult to measure because the heads are sometimes broader at the base than at the apex.

5-8. BRACT CHARACTERS. The bract disc is the brown central portion of the bract and does not include the appendages (Fig. 1). The variation in bract characters which can be observed in the field is very striking, but it is difficult to analyse in terms of single characters. The degree of overlapping of the bracts

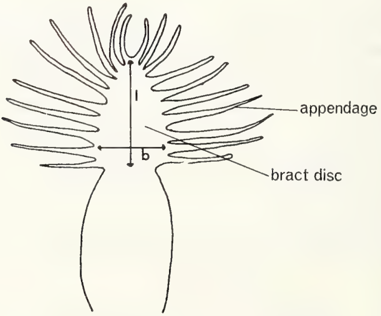

FIGURE 1. Bract of *Centaurea nigra* × 7.

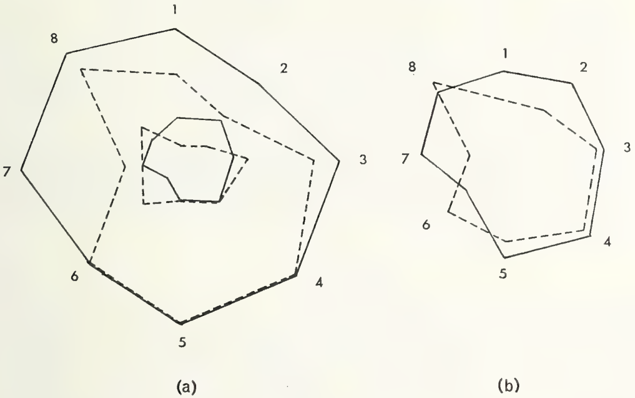

FIGURE 2. Polygon diagrams showing the variation in 50-plant samples from the Gogs (solid line) and from Wicken (broken line). (a) Range of variation in each sample. (b) Mean of variation in each sample.
The following characters were used:

1. Leaf ratio (length : breadth) lower leaves
2. Leaf ratio (length : breadth) upper leaves
3. Bract disc ratio (length : breadth)
4. Stem width ratio
5. Bract disc colour—light, medium, dark, very dark
6. Head ratio (length : breadth)
7. Number of flowering heads per plant
8. Height of plant

varies with the size and age of the head and it has very little taxonomic value. Although the lightest bracts are readily distinguishable from the darkest, most are intermediate and cannot be satisfactorily scored as light or dark. For precise studies of bract size and shape, bracts were mounted on cards with sellotape. There is greater variation in the shape of the bract disc than in appendage length.

There is no obvious correlation between the variation in the characters recorded, although there is a tendency for larger plants to be of the *nigra*-type and smaller plants to be of the *nemoralis*-type. From both the Wicken and Gogs topodemes plants could be selected which corresponded more or less precisely to the descriptions of subspp. *nigra* and *nemoralis*, but the majority of the plants could not be assigned to either subspecies except in an arbitrary way. The almost complete overlap in the variation of the two topodemes, and the similarities of the means of most characters, can be seen in Fig. 2.

Several other Cambridgeshire topodemes have been examined superficially and the range of variation they show is similar to that of the two topodemes studied in detail. Great though the variation is within Cambridgeshire topodemes of *C. nigra* it is only a fraction of the total British variation of the species. The rayed variant, which is common in parts of western England, and dwarf variants, which have been found in several parts of southern England, do not apparently occur in Cambridgeshire. Furthermore, the situation here is not complicated by the presence of *C. jacea*, which is thought to have hybridized with *C. nigra* in many places (Marsden-Jones & Turrill, 1954) and may give rise to a series of intermediates between the two species.

The difference in flowering time between the two topodemes studied in detail is of great interest because Jordan (1854) mentions this as one of the main distinguishing features between his *C. nemoralis* and *C. obscura* (= *C. nigra* subsp. *nigra*). This difference is not mentioned in Clapham, Tutin & Warburg (1962) and is worth more attention.

DISCUSSION

The amount of variation within *C. nigra* as a whole and within single topodemes is strikingly large, even for an outbreeding species. It may be necessary to have samples of as many as 100 plants to appreciate fully the extent of this variation within topodemes. Single specimens are not very useful, but small samples carefully collected to show the total range of variation in a small area would be much more useful. The underlying reasons for the amount of this variation are obscure. Hybridization may be important, as Marsden-Jones & Turrill (1954) suggested, but this is unlikely to be the sole factor involved.

Taxonomic treatment of the variation in *C. nigra* is very difficult because of the lack of clear discontinuities and the large amount of variation within topodemes. Recognition of any taxa within the species is bound to be somewhat arbitrary. Names for some of the more striking variants are useful, but more adequate description of the variation will probably involve the use of biosystematic categories. If correlations between the morphological variation and the ecology or distribution can be established this would justify the recognition of subspecies despite the presence of many intermediates. Such a correlation is not apparent in Cambridgeshire but may be found elsewhere.

What is now needed is the study of large samples of *C. nigra* from other parts of the country to see if these topodemes are as variable as the Cambridgeshire ones and to see if effective separation between subspp. *nemoralis* and *nigra* is possible. The advantages of turning an investigation of this sort into a class exercise are twofold. It emphasises the importance of population samples and greatly facilitates the collection of large quantities of data.

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NETWORK RESEARCH

During the afternoon of the Annual General Meeting held on May 11th, 1968 three papers were read outlining the Society's project for Network Research. D. E. Allen introduced the session with a short paper entitled 'An Introduction to Network Research' in which he outlined the historical background to the project.Two longer papers followed, shortened accounts of which appear below.

SYMPHYTUM SURVEY

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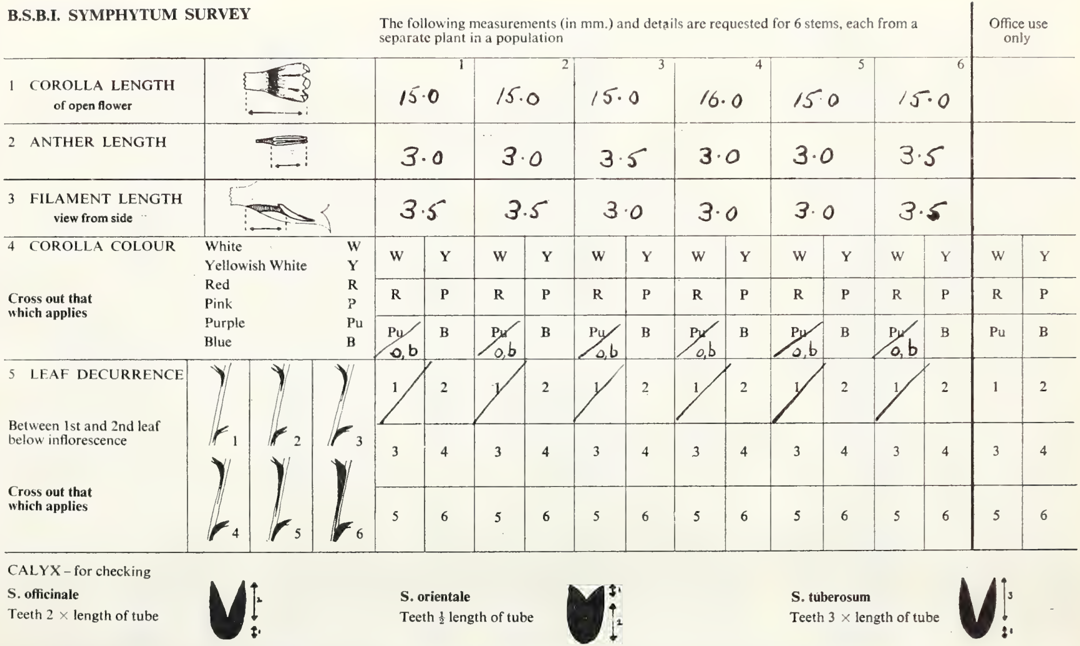
The maps of *Symphytum officinale* L. and S. *asperum* Lepech. published in the *Atlas of the British Flora* and that of S. × *uplandicum* Nyman in the *Critical Supplement* were inadequate because observers have been trying to fit four taxa and several taxonomic situations into only three pigeon holes.

The two species are very distinct: a summary of their characters is given in Table I. *S. officinale* occurs in two colour forms: yellowish-white, var.

TABLE 1. CHARACTERS OF *SYMPHYTUM OFFICINALE* AND *S. ASPERUM*

	S. officinale	*S. asperum*
Flower colour	Yellowish-white or reddish-purple.	Red in bud, clear blue in full flower (*fide* Nelson).
Leaf base	Strongly decurrent, running beyond one node.	Non-decurrent petiolate (leaves cordate).
Hairs on leaf and stem	Soft.	Asperous, rasping. Stem with short, stout, hooked bristles.
Anthers	Longer than filaments.	Shorter than filaments.
Chromosomes	$2n = 36$.	$2n = 40$.
Habitat	Fens, stream and river banks, wet ditches.	Roadsides.
Distribution	Lowland Britain; rare in Ireland where status uncertain.	Rare, always as a relic of cultivation.



ochroleucum DC. and reddish-purple, var. *purpureum* Pers. (var. *patens* Sibth.). The former occurs mainly in south and east England whilst the latter occurs in the south and west. Var. *purpureum* is not so frequent in natural habitats but if it was introduced it must have been over 300 years ago as it was known to Ray and Gerarde (Tutin, 1956). Where the distributions of the two colour varieties overlap, populations exhibiting all intermediate shades occur.

S. × *uplandicum* is thought to be a hybrid between *S. officinale* and *S. asperum*. Its characters are given in Table 2. It is possible that it originated in this country, but Wade (1958) could find no evidence for this. As *S. asperum* is very rare, whilst *S.* × *uplandicum* is very widespread it seems that almost all the populations of *S.* × *uplandicum* have originated from material, introduced from Russia as a forage crop in the middle of the nineteenth century, known as Russian Comfrey. The purple flower colour suggests that the *S. officinale* parent was var. *purpureum* rather than var. *ochroleucum*. Tutin (1956) reports that the Flora of the U.S.S.R. does not include a yellowish-white form as a Russian or Asiatic plant, so that hybrids of Russian origin might be expected to have purple flowers.

TABLE 2. CHARACTERS OF *SYMPHYTUM* × *UPLANDICUM*

Flower colour	Purple to purple-violet.
Leaf base	Not, or only slightly decurrent.
Hairs on leaf and stem	Hispid.
Anthers	Equalling filaments.
Chromosomes	$2n = 36$ (*fide* Nelson).
Habitat	Hedgebanks and roadsides.
Distribution	Throughout lowland Britain; local in Ireland.

Wade (1958) reports that *S.* × *uplandicum* breeds true from seed and produces uniform populations unless growing in proximity to *S. officinale* when backcrossing takes place. In such situations we can expect to find variation in flower-colour, leaf decurrence, etc. within a population. Backcrossing can presumably occur between *S.* × *uplandicum* and either of the colour varieties of *S. officinale* or the intermediates between them.

If all three of these taxa hybridise freely, the origin of the *Symphytum* problem is not far to seek; recorders will have had great difficulty in applying names correctly to the plants which they found. It is for this reason that we are asking members to provide not names, but a few simple measurements on 6 stems in a population on the record cards provided (Figure 1).

For this purpose a population consists of a group of plants growing in the same locality and in the same habitat. All plants from one population should be within 50 yards of each other. If the population is variable stems should be selected to reflect that variation. Six stems should be sufficient, but a second card could be used for the same locality if necessary. Observations should be made when some flowers are fully open, and flowers which have just opened should be chosen for measuring. When buds and flowers differ in colour this can be noted by putting b = bud and o = open flower in the appropriate box on the card. Decurrence has to be based on an average for the stem; wings which protrude less than 1 mm, or lines on the stem should be ignored.

In general, measurements are not required from more than one population of apparently similar plants in each 10 km square.

There are some other species of *Symphytum* in this country which might be recorded in error and a summary of their characters is given as a guide and warning.

S. orientale L.	Pure white flowers, flowers early (April). Calyx teeth only half length of tube.
S. tuberosum L.	Yellowish-white flowers. Calyx teeth 3 times as long as tube. Middle leaves of stem largest.
S. bulbosum K. Schimper	Yellow flowers with exserted filaments, flowers early (March to April).
S. grandiflorum DC.	Creamy-yellow flowers with *red* buds. Only species with long slender rhizomes.
S. caucasicum Bieb.	Flowers pale blue above, white below. Leaves softly hairy, not decurrent.

S. tauricum Willd. is almost certainly extinct whilst *S. leonhardtianum* Pugsl. may never have existed in this country, (*fide* Nelson, and McClintock, 1968).

I should like to thank Dr G. A. Nelson of the Department of Pharmacology, The University, Leeds, for invaluable help in the preparation of this paper and in the design of the record card.

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CAMPION ENQUIRY

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An examination of any population of either the Bladder or Sea Campion (*Silene vulgaris* (Moench) Garcke and *S. maritima* With.) will quickly show that there are distinct differences between each individual of a population, just as there are marked differences between the occupants of a bus or train. One plant may have hairy ovate leaves and female flowers with narrow petals, whereas another individual may have glabrous linear leaves and hermaphrodite flowers with wide petals. In the Bladder Campions there are some fifty characters which show marked variations, each variable character being usually controlled by two or more pairs of affeles, some of which may express themselves only under certain environmental conditions. Thus there may be a small amount of variation between the flowers on a single plant at any one time, and an even greater degree of difference in characters at different times of the year. In addition to variation within populations there is also a considerable difference between populations, especially between coastal and inland populations. For instance, coastal populations of *S. maritima* have much thicker and wider leaves than inland populations and these differences are retained when coastal plants, or their offspring, are transplanted to inland sites.

The Bladder Campions have already proved to be particularly suitable subjects for studies on variation and a considerable amount of literature has been published by E. M. Marsden-Jones, W. B. Turrill, and others. However, their work only forms a starting point and there is still a great deal to be found out about the patterns of variation, and their cause, in these two species. This extra information cannot possibly be obtained by one individual, or even a small group of botanists, especially if comparisons of different populations scattered throughout the British Isles are required at selected times during the year. The only way to obtain a comprehensive coverage of populations is by having a dense network of recorders who are prepared to act as a joint body. If every B.S.B.I. member made a special effort to examine one or more populations of a selected species in his own area we would be able to obtain a realistic population census for the whole of the British Isles. This would become even more valuable if it could be repeated at, say 10 or 20 year intervals, for certain species in order to find out if the population were static or in a state of flux: if the latter, then whether all populations were becoming modified in the same direction.

The two species of *Silene* have been selected for Network Research because they are known to be in an active state of evolution; the characters are easy to record and we have an idea of the cause of their variation; they form distinctive populations which are more or less isolated from one another; and, because they are common throughout the British Isles, the majority of B.S.B.I. members should be able to find at least one convenient population within easy reach of their home, or whilst they are on holiday. The characters to be examined occur in both species, but a certain character may be more frequent in one of them; for instance, hairy leaves are more frequent in *S. vulgaris*. One of the aims of the Campion Enquiry will be to discover the direction of selection of characters in relation to the environment and the habitat in which the species grow. Many of the characters showing variation appear, at present, to show no regular pattern of variation and they probably have little or no selective advantage under most environments; but there are some characters which definitely do seem to have a selective advantage, such as the tall stems of *S. vulgaris* as contrasted to the prostrate stems of *S. maritima*. This may be associated with the production of greater amounts of gibberellins (plant growth substances) in *S. vulgaris*, since plants of *S. maritima* which are sprayed with gibberellins produce succulent many-flowered stems up to four feet long.

Other characters which may be selected for would appear to be the development of long linear leaves in inland populations of *S. maritima* and the extensive development of anthocyanin pigmentation in plants of both species growing on shingle. The production of anthocyanin is particularly interesting as it is controlled by a whole series of genes with different sets of genes associated with red colouration in the seeds, styles, stamens, petals, leaves and other parts of each plant. Furthermore, many of the anthocyanin genes can only produce anthocyanin if the plant is exposed to full sunlight and growing in fairly dry soil.

One of the main aims of the Campion Enquiry will be to examine variation patterns both within and between as many populations as possible. We hope to find if certain characters are linked in all or only a few populations and to find which characters show clinal variation. The Enquiry is essentially concerned with recording the distribution of characters rather than recording the distribution of the actual species. Some examples of linkage are already known: for example female flowers usually have narrower petals, a less inflated calyx, and stamens with short filaments and abortive anthers without anthocyanin pigmentation. There are probably several examples of clinal variation, but we do not know if the cline is a gradual one or broken up into a number of steps. An example of a cline occurs in the date of first flowering where there is a delicate interplay between the effects of day-length and temperature. Populations of *S. maritima* in the south-west of Britain require a period of about eight hours before they come into flower whereas inland populations and plants further north, as well as plants from all populations of *S. vulgaris*, require a much longer period of daylight, but not necessarily higher temperatures, before they come into flower.

In the Campion Enquiry we do not want just the date on which the first plant came into flower: we would like to go a bit further. Experimental work has shown that there is a considerable variation between plants in any one population, with some plants coming into flower before others year after year. In some populations the majority of plants may come into flower within a period of one to two weeks, but in others there may be several weeks between the first and last plant to come into flower. Furthermore, there may be two or three cycles of flowering in some coastal populations, but just one cycle in inland populations. The date of last flowering is also of value, especially so if this can be noted for individual plants. For instance, was the last plant to come into flower the first to stop flowering? One might assume that the differences in flowering performance might be associated with differences in the microenvironmental conditions within populations, but this is not necessarily the case since one can have a freely-flowering plant next to a non-flowering plant when both are growing under identical conditions in growth rooms.

The information sent in by members will be recorded on to maps which will also show hours of day-length and temperature. If sufficient information is forthcoming it should be possible to show the relative importance of temperature and day-length on flowering in different parts of Britain, but this will have to be done for at least three years and backed up with a number of experiments under controlled conditions in growth rooms. A further development could be for members to grow cloned plants in their own gardens. It is hoped to build up stocks from ten or so diverse plants in order to compare the behaviour of selected genotypes under as many environmental conditions as possible. An advantage of this scheme would be that members could keep a daily record of performance of the differing strains under similar conditions and, in addition to recording flowering performance, they could also observe resistance to frost and disease.

Less detailed information is required for eight other characters which have been selected for initial study. For these we need to know the percentage frequency of each character in order to see if there is any clinal variation and where the particular character is either present or absent in all individuals. If the Enquiry is repeated at intervals it should be possible to see if any of these characters are spreading, or becoming extinct, in certain areas. It will also be important to find populations which are homozygous for certain characters for an independent programme of hybridization experiments in which it is hoped to find out more on the number and type of genes involved in the expression of each character.

We have planned a fairly modest start to the Campion Enquiry. Future activities are almost unlimited and a number of developments have been suggested. One particularly interesting development would be the extension of the Enquiry to cover the whole of Europe and to include the other species which are genetically closely related to *S. vulgaris* and *S. maritima.* There would appear to be at least ten species which are closely related. These have in some recent publications been classed as subspecies, but whether they are called species, or subspecies, they have all come from one ancestor, and in recent years they have become gradually adapted to different climates and environments with the associated selection of characters which suit them to the immediate conditions. The whole group appears to be in a state of flux and we have a good opportunity of examining evolution taking place at the present time. But the success of the Enquiry, and its future developments, depends upon the support given to it by members of the B.S.B.I. I hope that all members will do their best to obtain information from at least one population, thereby enabling us to produce a useful series of maps and provide us with a more satisfactory understanding of the evolutionary dynamics of such an interesting pair of species.*

*Copies of the 1968 Campion Enquiry Report will be sent to participating members free of charge. Other members may obtain copies (cost 1/- inc. postage) from Dr John P. Savidge, Dept. of Botany, University College of Wales, Aberystwyth.

PLANT NOTES

220/3 (9). ALCHEMILLA GLOMERULANS Buser—In southern Scotland.

Alchemilla glomerulans, a species of arctic-alpine distribution, was known in the British Isles only from the Scottish Highlands and Teesdale apart from a single plant found on river gravel, Lyne Water, Peeblesshire (Nat. Grid Ref. 36/166433) in 1964 by Dr S. M. Walters.

In June 1968, large colonies of the species were found by the writer in wet meadowland in the valley of the Ettrick in Selkirkshire at an altitude of 750 feet above sea level (Nat. Grid Ref. 36/275143). Dense colonies and scattered plants were present in a strip 30 yards long and 10 yards wide. The largest colony covered 6 square yards. There was a group of 4 plants 50 yards to the north of the main area and a small colony was present on the verge of the main road at a similar distance from the main group. The plants were healthy and robust with inflorescences, but they were not conspicuous as the surrounding vegetation tended to hide them.

The following species were associated with *Alchemilla glomerulans* in the main area: *Juncus acutiflorus* (c)*, *Filipendula ulmaria* (c), *Geum rivale* (c), *Rumex acetosa* (c), *Anthoxanthum odoratum* (c), *Lathyrus pratensis* (c), *Arrhenatherum elatius* (c), *Helictotrichon pubescens* (c), *Lotus uliginosus* (c), *Angelica sylvestris* (o), *Epilobium palustre* (o), *Stellaria graminea* (o), *Crepis paludosa* (o), *Alchemilla glabra* (o), *Potentila erecta* (o), *Poa trivialis* (o), *Festuca rubra* (o), *Equisetum palustre* (o), *Equisetum fluviatile* (o), *Carex disticha* (o), *Ranunculus acris* (r), *Heracleum sphondylium* (r), *Stalchys palustris* (r), *Valeriana officinalis* (r), *Veronica chamaedrys* (r), *Geranium sylvaticum* (r), *Deschampsia cespitosa* (r). In the drier parts of the locality, *Alchemilla glabra* was particularly abundant but *Alchemilla glomerulans* was absent.

Teesdale can no longer be considered unique within the British Isles in possessing this mountain species of *Alchemilla* in a lowland habitat. It is possible that *Alchemilla glomerulans* may be present in other similar lowland habitats in Scotland and Northern England.

I am very grateful to Dr S. M. Walters for his invaluable help in the preparation of this note.

* (c) common, (o) occasional. (r) rare.

—R. W. M. CORNER.

325/p. RUMEX PSEUDONATRONATUS (Borb.) Murb.—At Billinge Hill, Chester, V.C. 58.

Specimens of a dock from a quarry at Billinge Hill, Chester, v.-c. 58 were recently referred to this species (*Proc. bot. Soc. Br. Isl.*, 7, 25-26, (1967)), but the determination must now be corrected. In 1967 I planted seed in my London Garden from the gathering sent by Alan Newton on September 22, 1966 and this produced a plant maturing in July 1968 which exhibited all the usual characters of *R. longifolius* DC. In addition to the characteristic dense fusiform panicles of that species, it also had atypical branches with smaller more open panicles and flat narrow bracts and leaves. These were identical with the specimen sent by Mr Newton which deceived Dr Rechinger and myself earlier. Specimens of this cultivated material are being deposited at the Natural History Museum and, although the 1910 record as a casual at Hackney Marsh, Middlesex still stands, *R. pseudonatronatus* must be deleted from the list of established British species. The new locality for *R. longifolius* is the most southerly in Britain from which I have seen satisfactory material.—J. E. LOUSLEY.

605/1. JUNCUS SQUARROSUS L.—Dispersal of seeds.

Except for very obvious examples, such as succulent fruits that are eaten by birds and their seeds passed, there appears to me to be a tendency to regard wind as the only means by which seeds are dispersed. An illustration of this feature is provided by the article on *Juncus squarrosus* in the Biological Flora (Welch, 1966). Here we find the blunt statement 'Dispersal is by wind.' Now the seeds are small, rounded, fairly smooth and solid so do not suggest any adaptation for wind carriage.

There is, however, a feature I find that appears to have been overlooked. This is that, on contact with moisture, mucilage is discharged. Though nothing like the heavy discharge from the seeds of some species of saltmarsh plants it is sufficient to ensure adherence of such small seeds. Birds brushing past when the fruit is mature will receive seeds on their feathers and legs and such birds may be expected to fly often to similar areas of ground elsewhere, making the dispersal more selective than would be the case with casual movement by wind in all directions.

It is generally recognised that trees and hedges form a most effective windbreak and they must generally stop further movement of wind blown seeds. There even seem strong grounds for the opinion that seeds of most plants are moved by more than one method though they may not have seeds of different forms as with *Picris echioides* as mentioned by Salisbury (1964, p. 277), or several species of *Polygonums.*

REFERENCES

SALISBURY, E. J. (1964). *Weeds and Aliens.* London.

WELCH, D. (1966). *Juncus squarrosus* L. in Biological Flora of the British Isles. *J. Ecol.*, **54,** 535-548.

—H. E. GREEN.

663/55. CAREX APPROPINQUATA Schumach.—In Scotland.

Carex appropinquata is a very local species in the British Isles outside East Anglia and has not been recorded from Scotland within recent times. Lyell recorded it from Peeblesshire in 1855 but this has never been confirmed (D. McCosh, personal communication).

In 1967, two stations for *Carex appropinquata* were discovered by the author in Roxburghshire (v.c. 80), some 8 miles apart.

At Dunhog Moss, a Scottish Wildlife Trust reserve (Nat. Grid Ref. 36/474247) at an altitude of 900 feet, the species was common over a localised area of 20 yards by 10 yards and formed well marked fibrous tussocks the largest of which measured one foot high and one foot nine inches across. The habitat was wet with *Menyanthes trifoliata*, *Potentilla palustris*, *Carex diandra* and the occasional *Salix* bush as associated species.

The second station at Alemoor (Nat. Grid Ref. 36/385145) was at an altitude of 850 feet and was situated in flushed drier conditions at the base of a hill and at the side of a wet area containing *Carex acutiformis* as the dominant species. *Carex appropinquata* formed about 30 tussocks in a narrow strip about 25 yards long. These tussocks were less conspicuous because of the surrounding vegetation which consisted of much *Geum rivale* and *Filipendula ulmaria. Menyanthes trifoliata* was a very local species.

These records for *Carex appropinquata* represent a northward extension of its range in the British Isles from Mid-West Yorkshire (v.c. 64).

I am very grateful to Mr A. C. Jermy for his encouragement and help in the preparation of this note.

—R. W. M. CORNER.

PLANT RECORDS

Compiled by E. C. WALLACE

'Plant Records' are arranged in the order given in the *List of British Vascular Plants* (*L.B.V.P.*) by J. E. Dandy (1958).

Records where no date is given are for the year 1967.

The following signs are used:

§ before the *L.B.V.P.* number: to indicate that the paragraph contains information necessitating a correction to an annotated copy of the *Comital Flora*.

† before the *L.B.V.P.* number: to indicate that the plant is not a native species of the British Isles.

† before the record: to indicate a species which, though native in some parts of the British Isles, is not so in the locality recorded.

* before the record: to indicate a new vice county record, not published previous to this issue of the *Proceedings*. Some of these records may, however, appear as dots on maps of the particular species in the *Atlas of the British Flora* or in the *Critical Supplement to the Atlas of the British Flora*.

‡ before the record: to indicate a record additional to an annotated copy of the *Comital Flora*, but published elsewhere prior to the issue of the *Proceedings* in which it appears.

[] enclosing the record: to indicate doubt as to the validity of the record, either of identification or locality.

It will be useful if National Grid Co-ordinates, made as accurate as is thought advisable, are added to all records. These will not be published, but the original cards containing them will be filed, and may be made available for reference.

§ 1/4. LYCOPODIUM CLAVATUM L. **82,** Haddington; amongst heather on the south side of Tynningham Bay, near Dunbar, the first colony appeared in 1963—now there are several colonies, E. P. BEATTIE. **83,** Edinb.; north side of old colliery debris on south side of Breich Water, West Calder, locally abundant: ***84,** Linlithgow; north side of old coal bing, Winchburgh, R. CORNER, comm. E. P. BEATTIE.

§ 1/5. DIPHASIUM ALPINUM (L.) Rothm. (*Lycopodium alpinum* L.) ‡**103,** Mid Ebudes; south-east side of Ben More, 1966; south-west side of Maol nan Sgreuch, 1966, U. K. DUNCAN: Ben More summit, A. EDDY (1968, *Proc. bot. Soc. Br. Isl.* **7,** 365-372).

§ 11/1. ADIANTUM CAPILLUS-VENERIS L. ‡†**37,** Worcs.; railway bridge, Droitwich ic. 1952, E. J. GIBBONS (1968, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 84).

16/1. CETERACH OFFICINARUM DC. **82,** Haddington; several plants on a wall in Woodhall Dean, near Dunbar, 1968, E. P. BEATTIE.

22/2. POLYSTICHUM ACULEATUM (L.) Roth. **55b,** Rutland; Prior's Coppice, Leighfield, K. G. MESSENGER.

§ 25/1. POLYPODIUM VULGARE L. *sensu stricto*. ***7,** N. Wilts.; Wraughton, 1935: Somerford Common, 1966, J. D. GROSE, det. J. A. CRABBE. **8,** S. Wilts.; Bidcombe Hill, 1965, N. E. KING, det. J. A. CRABBE.

§ 25/1. POLYPODIUM INTERJECTUM Shivas. ***7,** N. Wilts.; Hodson, 1935; Derry Hill, 1950: ***8,** S. Wilts.; St. Bartholomew's Hill, 1966; Britmore Bog, 1966, J. D. GROSE, all det. J. A. CRABBE. ‡**37,** Worcs.; Suckley Hills, 1967, J. A. KIERNAN (1968, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 84).

46/11. RANUNCULUS LINGUA L. **†7**, N. Wilts.; pond, Corsham, Mrs. J. SWANBOROUGH.

47/1. ADONIS ANNUA L. **8**, S. Wilts.; reappeared in quantity in its old locality at Odstock, LADY RADNOR.

§ 58/3. PAPAVER LECOQII Lamotte. ***55b**, Rutland; grassy railway bank, Oakham, casual, 1965, K. G. MESSENGER.

§ 115/6b. HYPERICUM MACULATUM Crantz subsp. OBTUSIUSCULUM (Tourlet) Hayek. ***21**, Middx.; railway bank on heavy clay soil, West Acton, 1966, J. McLEAN, conf. N. K. B. ROBSON, comm. D. H. KENT.

§ 115/13. HYPERICUM MONTANUM L. **‡55b**, Rutland; limestone grassland at top of railway cutting, Ketton, 1966, K. G. MESSENGER, conf. T. G. TUTIN.

§ 122/1. ELATINE HEXANDRA (Lapierre) DC. **‡103**, Mid Ebudes; Loch Bearnach, in 20-40 cm. of water, on mud, A. EDDY (1968, *Proc. bot. Soc. Br. Isl.*, **7**, 365-372).

§ 131/5. CERASTIUM ARCTICUM Lange. **‡103**, Mid Ebudes; north-east corrie, Ben More, A. EDDY (1968, *Proc. bot. Soc. Br. Isl.*, **7**, 365-372).

§ 131/10. CERASTIUM DIFFUSUM Pers. (*C. atrovirens* Bab.) **‡†55b**, Rutland; cinder ballast of disused railway yard, Manton, 1965, K. G. MESSENGER.

§ 143/1. SPERGULARIA RUBRA (L.) J. & C. Presl. **‡H.20**, Wicklow; a single plant in a lane near Aughavannagh, 1965; *c.* 20 plants, 1967, probably introduced from another district, R. N. GOODWILLIE (1968, *Ir. Nat. J.*, **16**, 26).

§ 171/1. IMPATIENS NOLI-TANGERE L. **‡†103**, Mid Ebudes; roadside, Torloisk, A. G. KENNETH (1968, *Proc. bot. Soc. Br. Isl.*, **7**, 365-372).

187/2. ULEX GALLII Planch. **H.21**, Dublin; Ballygall Road, East Glasnevin, D. DOOGUE (1968, *Ir. Nat. J.*, **16**, 79).

§†191/2. MELILOTUS OFFICINALIS (L.) Pall. **‡H.22**, Meath; town dump, Drogheda, D. M. SYNNOTT (1968, *Ir. Nat. J.*, **16**, 27).

§†191/3. MELILOTUS ALBA Medic. **‡H.22**, Meath; town dump, Drogheda, D. M. SYNNOTT (1968, *Ir. Nat. J.*, **16**, 27).

§†191/4. MELILOTUS INDICA (L.) All. **‡H.22**, Meath; town dump, Drogheda, D. M. SYNNOTT (1968, *Ir. Nat. J.*, **16**, 27).

§†192/17. TRIFOLIUM HYBRIDUM L. **‡103**, Mid Ebudes; Ulva, in a field near church on north-east side, 1965, U. K. DUNCAN (1968, *Proc. bot. Soc. Br. Isl.*, **7**, 365-372).

192/24. TRIFOLIUM MICRANTHUM Viv. **H.21**, Dublin; near the Obelisk, Killiney Head, D. DOOGUE (1968, *Ir. Nat. J.*, **16**, 79).

207/2. LATHYRUS NISSOLIA L. **55b**, Rutland; Pilton Quarries, North Luffenham, Mrs J. BUCHANAN, comm. K. G. MESSENGER.

212/14 × 13. POTENTILLA ANGLICA × ERECTA. **55b**, Rutland; around mouth of railway tunnel, Glaston, K. G. MESSENGER, det. P. M. BENOIT.

§ 220/3(3). ALCHEMILLA FILICAULIS Buser. subsp. FILICAULIS. **‡103**, Mid Ebudes; rocks, Allt na Teangaidh, 1965; Creach Beinn, 1965, A. G. KENNETH (1968, *Proc. bot. Soc. Br. Isl.*, **7**, 365-372).

§†220/3(12). ALCHEMILLA MOLLIS (Buser) Rothm. **‡33**, E. Glos.; quarry at side of Brockworth/Painswick Road, 'W.H.G.' and S. C. HOLLAND (1968, *J. North Glos. Nat. Soc.* **19**, 317).

232/7. SORBUS TORMINALIS (L.) Crantz. **8**, S. Wilts.; hedge between Wilsford and Basingstoke, Miss C. MOORE.

238/1. UMBILICUS RUPESTRIS (Salisb.) Dandy. **55**, Leics.; Swithland Churchyard wall, *c.* 100 plants; presumably these plants originated from plants taken from the nearby ancient slate quarries, the only locality in the county where this interesting and distinctive plant is considered to be indigenous, S. MUSGROVE (1968, *Heritage*, **29**, 12).

§ 291/1. Carum verticillatum (L.) Koch. ‡**103,** Mid Ebudes; Corrynuchenchy, Fishnish, A. G. Kenneth (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

318/2. Mercurialis annua L. **55,** Leics.; sandy waste ground, Queniborough, with numerous other ruderal species. Large numbers of plants scattered over about ½ acre; approx. equal numbers of male and female plants. Judging by the numbers and distribution of the plants in this area, it seems to have been established for some time, though I have not seen it before in Leicestershire, A. L. Primavesi.

325/13 × 14. Rumex pulcher × sanguineus, **23,** Oxon.; limestone grassland, in shelter of bushes, Dean Bottom, near Swinbrook, Windrush valley, below Burford, R. C. Palmer, conf. J. E. Lousley.

§ 335/3. Betula nana L. ‡**103,** Mid Ebudes; ['Ben Mohr, Mull, 6 1878', H. H. Slater (Herb. Somerset County Museum, Taunton)]. Recent efforts to refind this station have failed and the possibility that the original specimen may have come from one of the other mountains named Ben More cannot be completely ruled out, J. F. M. Cannon and E. B. Bangerter (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

*408/1. Nicandra physalodes (L.) Gaertn. **55,** Leics.; neglected herbaceous border on clay soil, Ratcliffe College, Syston, Leicester, five large well-developed plants and a few small ones, A. L. Primavesi, det. T. G. Tutin.

§ 413/1. Solanum dulcamara L. ***103,** Mid Ebudes; rocky shore west of Carsaig and the Nun's Pass, one plant in crevice of sandstone rock, A. G. Kenneth and A. McG. Stirling (1968, *Proc. bot. Soc. Soc. Br. Isl.*, **7,** 365-372).

§†416/9. Verbascum blattaria L. ‡**31,** Hunts.; site of an old cottate near Easton, B. N. K. Davis (1968, *Rep. Huntingdon. Fauna Flora Soc.*, **20,** 3).

§ 420/3. Linaria repens (L.) Mill. ‡†**103,** Mid Ebudes; roadside near new housing estate, Salen, 1966, U. K. Duncan (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

439/1. Lathraea squamaria L. **H.21,** Dublin; top of Jamestown Road, Finglas, Dublin, 1965→, D. Doogue (1968, *Ir. Nat. J.*, **16,** 79).

§ 440/10. Orobanche hederae Duby. ***36,** Hereford; Whitchurch, *c.* 20 spikes, W. D. Graddon. ‡**37,** Worcs.; Randan Wood, F. Fincher, conf. at roy. bot. gardens, kew (1968, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 85).

445/4 × 5. Mentha × piperita L. **45,** Pembroke; by side of a stream, Abereiddy Bay; probably a spontaneous hybrid in an area where peppermint is not cultivated, J. T. H. Knight, conf. R. M. Harley.

445/7. Mentha suaveolens Ehrh. (*M. rotundifolia* auct., non L.). **45,** Pembroke; waste ground, Aber-Eiddy Bay, J. T. H. Knight, conf. R. M. Harley.

459/4. Stachys germanica L. **23,** Oxon.; limestone grassland at edge of stony cornfield near Asthall Leigh, in ± full exposure and avoiding taller vegetation, R. C. Palmer.

§ 487/1. Sambucus ebulus L. ‡**H.31,** Louth; roadside near the pond at Bolies, *c.* 3 miles north-north-west of Dunleer; also by nearby Bog Road, Mullinscross, D. M. Synnott (1968, *Ir. Nat. J.*, **16,** 29).

†491/4. Lonicera caprifolium L. **23,** Oxon.; well naturalised among trees by stream and in adjacent limestone scrub, Cottisford Heath, three miles south of Brackley, R. C. Palmer.

506/4 × 7. Senecio × londinensis Lousley. **31,** Hunts.; rubbish-dump, Buckden, J. G. Dony (1968, *Rep. Huntingdon. Fauna & Flora Soc.*, **20,** 4).

§ 506/7. Senecio viscosus L. ‡**103,** Mid Ebudes; roadside near pier, Ulva, 1966, U. K. Duncan: beside telephone kiosk, Craignure, A. G. Kenneth and A. McG. Stirling (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

§ 569/1. Lloydia serotina (L.) Reichb. *†**43,** Radnor; See Plant Note in *Proc. bot. Soc. Br. Isl.*, **7,** 387-393 (1968). -Ed.

†571/1. Lagarosiphon major (Ridl.) Moss. **7,** (E. Glos.); gravel-pit, Poole Keynes, Mrs S. C. Holland.

§ 577/5. Potamogeton lucens L. ‡**103,** Mid Ebudes; north side of Loch Poit na h-I, 1966, U. K. Duncan, conf. J. E. Dandy (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

§ 577/16. Potamogeton trichoides Cham. & Schlecht. ‡**37,** Worcs.; Titford, Oldbury, 1950, Miss D. A. Cadbury, det. J. E. Dandy (1968, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 85).

§ 582/1. Eriocaulon aquaticum (Hill) Druce (*E. septangulare* With.). ***97,** Westerness; Ardnamurchan, W. Dolling, conf. F. Rose, E. C. Wallace and D. McClintock, comm. J. E. Lousley.

605/4. Juncus compressus Jacq. **31,** Hunts.; marshy area, St. Neots Common; first record for *c.* 100 years, T. C. E. Wells (1968, *Rep. Huntingdon. Fauna Flora Soc.*, **20,** 5).

625/3. Epipactis purpurata Sm. **55b,** Rutland; Prior's Coppice (west), Brooke, 1966, K. G. Messenger, conf. T. G. Tutin.

643/2 × 4. Dactylorhiza maculata × praetermissa. **13,** W. Sussex; Heysholt Common, J. T. H. Knight, conf. P. F. Hunt.

643/3 × 2. Dactylorhiza incarnata × maculata. **13,** W. Sussex; Heysholt Common, J T. H. Knight, conf. P. F. Hunt.

§ 654/2. Eriophorum gracile Roth. ‡**H.23,** Westmeath; on the southern part of the 'Scraw bog' which lies halfway between Mullingar and Multyfarnham, M. J. Scannell, D. M. Synnott and D. A. Webb (1968, *Ir. Nat. J.*, **16,** 12).

§ 655/10. Scirpus setaceus L. ‡**31,** Hunts; low-lying, marshy areas, St. Neots Common, T. C. E. Wells and B. N. K. Davis (1968, *Rep. Huntingdon. Fauna Flora Soc.*, **20,** 2).

§ 663/48. Carex aquatilis Wahlenb. ***112,** Zetland; east end of Papil Water, Fetlar, a large patch in shallow water with *Hippuris vulgaris*, etc., R. C. Palmer, conf. A. C. Jermy.

†672/6. Vulpia ciliata Link. **14,** E. Sussex; old railway track and platform, Ardingly Station, among *V. myuros*, apparently well established, R. C. Palmer, conf. C. E. Hubbard.

675/1. Nardurus maritimus (L.) Murb. **23,** Oxon; disused railway tracks, etc., Banbury-Chipping Norton line about Hook Norton, R. C. Palmer.

§ 676/3. Poa bulbosa L. ***9,** Dorset; sandy, gravelly, track leading to Sherborne Castle, Sherborne, *c.* 20 flower-heads, 1968, A. C. Leslie, conf. R. d'O. Good.

§ 681/2. Melica nutans L. ‡**103,** Mid Ebudes; streamside, Calgary, 1965, A. G. Kenneth (1968, *Proc. bot. Soc. Br. Isl.*, **7,** 365-372).

ABSTRACTS FROM LITERATURE

Compiled by D. H. KENT

Thanks are due to E. B. Bangerter for his assistance, and I am again indebted to Dr R. K. Brummitt and Dr I. K. Ferguson for drawing my attention to various obscure references.

SYNOPSIS

Page
Systematic, etc. 567
Topographical 595
Floras, Catalogues, etc. 599
Ecological (see also Topographical) 600
Phytosociological, Phytogeographical and Floristic Studies 602
Chromosome Surveys 608
Historical 608
Biographical 610
Obituaries 610
Palaeobotany 611
Herbarium, Laboratory, Recording techniques, etc. 612
Classification, Nomenclature and Botanical Terminology 612
Miscellaneous 613

SYSTEMATIC, ETC.

1. **Lycopodiaceae.** Vasconcellos, J. de, Carvalho, E. & Franco, J. do Amaral, [1967] 1968, Breves notas sobre Licopodiáceas, *Bolm. Soc. broteriana*, ser. 2A, **41,** 23-25. *Lycopodium suberectum* Lowe is reduced to *Huperzia selago* (L.) Schrank & Mart. subsp. *suberecta* (Lowe) Franco & Vasc., comb. nov. and a new genus *Pahinhaea* Franco & Vasc., nov. gen. is proposed, its type species being *P. cernua* (L.) Franco & Vasc., comb. nov. (*Lycopodium cernuum* L.).

The occurrence of *Lycopodium clavatum* in Portugal has been established and the records for the country are reviewed.—[D.H.K.]

1/4. **Lycopodium clavatum L.** Einarsson, E., 1968, Burstajafininn í Breiodal (Lycopodium clavatum L.), *Náttúrufraedingurinn*, **36,** 183-195. A number of eighteenth and nineteenth century authors recorded *Lycopodium clavatum* from Iceland, but none of them gave a precise location for the species. In 1917 it was discovered at Ormastadafjall in the south-east of the island. The specimens were all sterile, and the plant had apparently not been seen again in Iceland and was considered possibly extinct. On 23 August 1966 the author succeeded in refinding the species in its original locality. The habitat is a very small one of *c.* 4 metres^2, situated in a shallow depression at an altitude of 180 metres on a steep mountain slope. The dominant vegetation of the area is *Empetrum hermaphroditum*, *Vaccinium uliginosum* and *V. myrtillus*, though other species were also present. Some of the plants of *L. clavatum* were fertile, though no ripe spores were found on the cones in spite of the late date of the discovery. It seems unlikely that spores of the species ripen in Iceland except in especially warm summers.

The Icelandic plant does not appear to belong to the var. *lagopus* Laest. as suggested by Hylander (*Förteckning över Norders växter*, 1. *Kärlväxter* (1955)), but seems to be referable to the species as represented in Scandinavia and the British Isles.—[D.H.K.]

2/1. Selaginella selaginoides (L.) Link. Jung, W., 1968, Selaginella selaginoides (L.) Link in eiszeitlichen Ablagerungen des bayerischen Alpenvorlands, *Ber. bayer. bot. Ges.*, **40,** 51-53.

4. Equisetum. Agashe, S. N., 1968, Phloem studies in the Pteridophyta, part 1. Equisetum, *Am. Fern J.*, **58,** 74-77.

4/1. Equisetum hyemale L. Ryvarden, L., 1968, Equisetum hiemale og Anthyllis vulneraria i Norge (≪ Årets planter ≫ 1967), *Blyttia*, **26,** 86-89. The distributions of *Equisetum hyemale* and *Anthyllis vulneraria* in Norway have been studied in a survey made by members of the Norwegian Botanical Association. The results of this project are shown by dot distribution maps, which reveal that *E. hyemale* is quite rare in Finnmark (northern Norway), and along the coast in southern Norway. The species appears to prefer calcareous soils and a continental climate.

Anthyllis vulneraria is also a calcicole, and its habitats fall into three groups: (1) in rocks and crevices along the coast, (2) in the areas between the coast and the mountains, where it appears almost always adventive, by roadsides and railways, etc., (3) in the mountains, where it occurs in scree and rock crevices. —[D.H.K.]

4/3. Equisetum ramosissimum Desf. Pant, D.D. & Kidwai, P.F., 1968, Development of stomata in Equisetum, *Ann. Bot.*, **32,** 601-608. Studies on the development of stomata in *Equisetum ramosissimum*.—[D.H.K.]

4/9. Equisetum arvense L. Laroche, J., 1968, Contribution à l'étude de l'Equisetum arvense L., *Revue gén. Bot.*, **75,** 65-116. Studies on the silica content of *Equisetum arvense*.—[E.B.B.]

4/10. Equisetum telmateia Ehrh. Holland, S.C., 1968, Spiral shoots in the great horsetail, Equisetum telmateia Ehrh., *J. North Glos. Nat. Soc.*, **19,** 321. Details are given of a stand of abnormal *Equisetum telmateia* noted growing by a small Cotswold stream in 1964.—[D.H.K.]

5.→ Pteropsida. Berton, A., 1968, A propos de Flora Europaea: Caractères anatomiques des Fougères, *Monde des Plantes*, **63** (359), 4-5. Comments on, and annotations to, the descriptions of various ferns given in volume 1 of *Flora Europaea*.—[D.H.K.]

5.→ Pteropsida. Kaye, R., 1968, *Hardy Ferns*. Pp. 203. Faber & Faber Ltd., London. Price 63/-. A new account of hardy ferns in cultivation which includes not only descriptions and cultural details, but also data on the identification and variation of British fern species.—[D.H.K.]

5.→ Pteropsida. Oliver, J. C., 1968, A study of spore characteristics of the Ferns of Indiana, *Am. Fern J.*, **58,** 5-12. A key to the identification of the Ferns of Indiana based on spore characters. Species which occur also in Britain are *Osmunda regalis*, *Pteridium aquilinum*, *Thelypteris phegopteris*, *T. palustris*, *Dryopteris cristata*, *D. carthusiana*, and *Onoclea sensibilis*.—[D.H.K.]

5.→ Pteropsida. Synnott, D. M., 1968, Unpublished fern records of J. R. Kinahin, *c.* 1854, *Ir. Nat. J.*, **16,** 39-42. Notes in J. R. Kinahin's [1828-1863] notebooks at the National Museum of Ireland, Dublin, contain many records of Irish ferns with dates between 1848 and 1854. Many of the localities given constitute first records for various Irish vice counties. These are listed, with dates and localities. —[D.H.K.]

5/1 Osmunda regalis L. Swindells, P., 1968, Hardy ferns in cultivation, 5. Royal, Moonwort and Adder's Tongue, *Gdnrs' Chron.*, **164** (1), 20-21. *Osmunda regalis, Botrychium lunaria* and *Ophioglossum vulgatum* are all in cultivation. *Botrychium multifidium* (S. G. Gmelin) Rupr. (*B. matricariae* (Schrank) Sprieng) is occasionally grown.—[D.H.K.]

6.→ HYMENOPHYLLACEAE. Morton, C. V., 1968, The genera, subgenera and sections of the Hymenophyllaceae, *Contr. U.S. nat. Herb.*, **38**, 153-214. Descriptions and keys are provided to the genera, subgenera and sections of the Hymenophyllaceae. —[D.H.K.]

11. ADIANTUM. Swindells, P., 1968, Hardy ferns in cultivation, 4. Maidenhair and Spleenwort, *Gdnrs' Chron.*, **163** (26), 14-15. Species of *Adiantum* in cultivation include *A. capillus-veneris*, *A. pedatum*, etc., while those of *Asplenium* include *A. trichomanes*, *A. viride*, *A. ruta-muraria*, *A. adiantum-nigrum*. *A. obovatum* and *A. septentrionale*. The latter, however, is said to be difficult to cultivate.—[D.H.K.]

12/1. ONOCLEA SENSIBILIS L. Klekowski, E. K. Junr. & Lloyd, R. M., 1968, Reproductive biology of the pteridophyta, 1. General considerations and a study of Onoclea sensibilis L., *J. Linn. Soc. Bot.*, **60**, 315-324.

13/1. BLECHNUM SPICANT (L.) Roth. Löve, A & Löve, D., 1968, Cytotaxonomy of Blechnum spicant, *Coll. Bot.*, **7**, 665-676. The fern species *Blechnum spicant* (L.) Roth includes the European subspecies *spicant* and the Pacific subspecies *nipponicum* (Kunze) Löve & Löve, the latter being a larger plant. Although most varieties and formae so far described within the European subspecies are regarded as taxonomically worthless or unimportant, two homophyllous but independent varieties are accepted, i.e. var. *fallax* Lange from a single hot spring in western Iceland and var. *homophyllum* (Merino) Löve & Löve from northwest Spain and northern Portugal. Both these have $2n = 68$ chromosomes as previously reported for heterophyllous plants of both the subspecies.—[Authors' summary]

14. PHYLLITIS.—See 16 CETERACH.

15. ASPLENIUM. Meyer, D. E., 1968, Über neue und seltene Asplenien Europas, 5. Mitteilung, *Ber. dt. bot. Ges.*, **81**, 92-106. Further descriptions and notes on European species and hybrids of *Asplenium*.—[D.H.K.]

15. ASPLENIUM.—See 11. ADIANTUM.

15/5. ASPLENIUM TRICHOMANES L. Bouharmont, J., 1968, Les formes chromosomiques d'Asplenium trichomanes L., *Bull. Jard. Bot. Belg.*, **38**, 103-114. Chromosome studies on *Asplenium trichomanes* has confirmed the existence of different cytotypes. The diploid is found on siliceous rocks, but the tetraploid occurs in a variety of habitats. Triploid hybrids are not infrequent and give rise to a few hexaploid plants. The tetraploid appears to be an autotetraploid derived from the diploid, but further investigations are needed to confirm this hypothesis.—[D.H.K.]

16. CETERACH. Fenaroli, L., 1967, Die europäischen Hirschzungen. *Jahrb, Ver. Schutz. Alpenfl. u-tiere*, **32**, 49-56. Chorological studies on the *Ceterach-Phyllitis* complex in Europe.—[D.H.K.]

18. ATHYRIUM.—See 22. POLYSTICHUM.

21. DRYOPTERIS. Swindells, P., 1968, Hardy ferns in cultivation, 1. Male or Buckler Ferns, *Gdnrs' Chron.*, **163** (23), 12-13. Notes on some of the species, varieties and forms of *Dryopteris* in cultivation.—[D.H.K.]

21. DRYOPTERIS. Swindells, P., 1968, Hardy ferns in cultivation, 6. More Buckler Ferns, *Gdnrs' Chron.*, **164** (2), 15. Further notes on species, etc. of *Dryopteris* in cultivation.—[D.H.K.]

21/1 × 2. DRYOPTERIS × TAVELII Rothm. Lawalrée, A., 1968, Une étrange station de Dryopteris × tavelii Rothmaler à Lisens (Tyrol Autrichien), *Coll. Bot.*, **7**, 621-624.

22. POLYSTICHUM. Swindells, P., 1968, Hardy ferns in cultivation, 3. Shield and Lady ferns, *Gdners' Chron.*, **163** (25), 16-77. Notes on species and cultivars of *Polystichum* and *Athyrium* grown in gardens.—[D.H.K.]

24. THELYPTERIS.—See 21. DRYOPTERIS.

28. BOTRYCHIUM.—See 5/1. OSMUNDA REGALIS L.

28/4. BOTRYCHIUM MULTIFIDUM (S. G. Gmel.) Rupr. Traczyk, H., 1967, Linnaea borealis L. i Botrychium multifidum (Gm.) Rupr. w Puszzy Kampinoskej, *Fragm. Flor. geobot.*, **13**, 319-321. Notes on new localities for *Botrychium multifidum* and *Linnaea borealis* in the Kampinos Forest near Warsaw. The former grows on a small hill surrounded by wet meadows, while the latter occurs in a community of pine and oak in one of the few stations for the species in lowland central Poland.—[D.H.K.]

29/1. OPHIOGLOSSUM VULGATUM L.—See 5/1. OSMUNDA REGALIS L.

29/1b. OPHIOGLOSSUM AZORICUM C. Presl (*O. vulgatum* L. subsp. *ambiguum* (Coss. & Germ.) E. F. Warb.). Kunkel, G., 1968, Botánica Miscelánea, 2. Ophioglossum azoricum en la Isla de Lobos, *Cuad. Bot.*, **3**, 54-55. *Ophioglossum azoricum* is reported from the Isle of Lobos. It is new to the Canary Islands, and a table shows the differences between it and *O. lusitanicum*.—[D.H.K.]

29/P. PTERIS VITTATA L. Holland, S., 1968, A remarkable Gloucestershire site in the Forest of Dean for the tropical Fern Pteris vittata L., *J. N. Glos. Nat. Soc.*, **19**, 318-321. Further data is provided on the locality for *Pteris vittata* in the Forest of Dean (cf. 1964, *Proc. bot. Soc. Br. Isl.*, **5**, 336; *loc. cit.*, 1968, **7**, 387.) as a result of a visit made to the site by the author and friends on 23 May, 1968. Details of additional associated species are provided.—[D.H.K.]

31/1. PICEA ABIES (L.) Karst. Kramer, H., 1966, Zum Wachstrum der Fichte (Picea abies) in Grossbritannien, *Allgem. Forst. u Jagdzeit.*, **137**, 53-67.

32. LARIX. Ekberg, I., Eriksson, G. & Sulíková, Z., 1968, Meiosis and pollen formation in Larix, *Hereditas*, **59**, 427-438.

33/1. PINUS SYLVESTRIS L. Carlisle, A. & Brown, A. H. F., 1968, Pinus sylvestris L. in Biological Flora of the British Isles, *J. Ecol.*, **56**, 269-307.

33/1. PINUS SYLVESTRIS L. Saatçiojlu, F., 1967, Result of the 25 years provenance experiment established by using 16 Scotch Pine of European and 1 of native provenance, *Istanb. Univ. Orman. Fak. Derg.*, *Ser. A*, **17**, 19-30.

36.→ RANUNCULACEAE. Jensen, U., 1968, Serologische Beiträge zur Systematik der Ranunculaceae. *Bot. Jb.*, **88**, 204-310.

36/1. CALTHA PALUSTRIS L. Smit, P. G., 1968, Taxonomical and ecological studies in Caltha palustris L., 2. *Proc. K. ned. Akad. Wet.*, *Ser. C*, **71**, 280-292.

41. DELPHINIUM. Munz, P. A., 1967, A synopsis of the Asian species of Delphinium sensu stricto, *J. Arnold Arbor.*, **49**, 233-259. The completion of a revision of the Asian species of *Delphinium*, with descriptions, keys, etc.—[D.H.K.]

43/2. ANEMONE RANUNCULOIDES L. Slavíková, Z., 1967, Zur Morphologie der Blütenhülle von Ranunculaceen, 3. Anemone ranunculoides L.. *Nov. Bot. Hort. Bot. Univ. Prag.*, **1967**, 37-44.

44/1. PULSATILLA VULGARIS Mill. Anon. 1968, Damage to the Pasqueflower, *Reading Nat.*, **20**, 55. Further notes on damage to *Pulsatilla vulgaris* in 'Juniper Valley' near Reading, based chiefly on observations by Miss Cecily Duthoit of the N.A.A.S., South Eastern Region (Reading). Only flower heads were attacked, and invariably these were clean cut through the pedicel below the flower head. Slugs (*Agriolimax reticulatus*) and snails (*Helicella* spp.) were very occasionally noted feeding on the cut portions but the damage could not be attributed to them. It is known that the Wood Mouse (*Apodemus s. sylvaticus*) and other mammals, e.g. the Bank Vole (*Clethrionomys glareolus britannicus*), have severely damaged commercially-grown field crops of Anemones in Devon, and the damage found in the *Pulsatilla* populations is of a similar nature.—[D.H.K.]

45. CLEMATIS. Daumann, E. & Slavíková, Z., 1968, Zur Blütenmorphologie der tschechoslowakischer Clematis-Arten, *Preslia*, **40,** 225-244.

46. RANUNCULUS. Bot, J. & Spoel-Walvius, M. R. van der, 1968, Description of Ranunculus repens L. and R. arvensis L. pollen, *Acta bot. neerl.*, **17,** 173-182.

46/10. RANUNCULUS AURICOMUS L. Demarsin, J.-P., 1968, Bijdrage tot de Kentnis der variabiliteit van Ranunculus auricomus L. in België, *Bull. Jard. Bot. Nat. Belg.*, **38,** 209-253. A revision of *Ranunculus auricomus* in Belgium, including descriptions and illustrations of 14 new subspecies.—[D.H.K.]

46/15. RANUNCULUS SCELERATUS L. Saber, A. Hifny, Mahran, G. H. & El-Alfy, T., 1968, Phytochemical investigation of Ranunculus sceleratus L., *Planta medica*, **16,** 231-238.

48/1. MYOSURUS MINIMUS L. Slavíková, Z., 1968, Zur Morphologie der Blütenhülle von Ranunculaceen, 2, Myosurus minimus L., *Preslia*, **40,** 113-121.

64. DICENTRA. Fahselt, D. & Ownbey, M., 1968, Chromatographic comparison of Dicentra species and hybrids, *Am. J. Bot.*, **55,** 334-345.

65/3. CORYDALIS CLAVICULATA (L.) DC. Griffioen, H., 1968, Corydalis claviculata (L.) DC. als winterannuel, *Gorteria*, **4,** 43. *Corydalis claviculata*, commonly known as a summer-annual, can also appear as a facultative winter-annual, especially in mild winters.—[Author's summary]

67. BRASSICA. Shebalina, M.A., 1968, The history of botanical investigation and classification of turnips, *Bull. Appl. Bot. Genetics Pl. Breeding*, **38,** 44-87.

85/1. TEESDALIA NUDICAULIS (L.) R.Br. Houfek, J., 1968, Teesdalia nudicaulis (L.) R.Br.—nanhoprutka písečná v čes koslovensky, 1, *Preslia*, 40, 163-183. The history, distribution and phytosociology of *Teesdalia nudicaulis* in Czechoslovakia is reviewed.—[D.H.K.]

88. COCHLEARIA. Smejkal, M., 1968, Československé druhy rodu Cochlearia L., *Preslia*, **40,** 133-138. A study of *Cochlearia* in Czechoslovakia has shown that only two species are present, viz. *C. officinalis* and *C. tatrae* Borbás, the latter being confined to the higher Tatra Mountains. Records of *C. polonica* E. Fröhl. are erroneous as the species is endemic to Poland, and records of *C. pyrenaica* are referable to *C. tatrae*.—[D.H.K.]

90/2. BUNIAS ORIENTALIS L. Jehlík, V. & Slavík, B., 1968, Beitrag zum Erkennen des Verbreitungscharakters der Art Bunias orientalis L. in der Tschechoslowakei, *Preslia*, **40,** 274-293. The historical spread and present distribution of the adventive *Bunias orientalis* in Czechoslovakia is reviewed, and illustrated by a map. Ecological data and lists of associated species are also provided.—[D.H.K.]

91. ALYSSUM. Dudley, T. R., 1968, Alyssum (Cruciferae) introduced in North America, *Rhodora*, **70,** 296-298. Apart from *Alyssum alyssoides* and *A. desertorum* Stapf, both well-known as established introductions in the United States, three previously unrecorded adventive species have been detected by an examination of herbarium material. *A. szowitsianum* Fisch. & Mey, was gathered in Utah in 1944; *A. minus* (L.) Rothm. var. *micranthum* (A. Meyer) Dudley was collected in Colorado in 1940, in Utah in 1944 and California in 1961, while *A. strigosum* Banks & Solander was gathered in California in 1920.—[D.H.K.]

100/4. ARABIS HIRSUTA (L.) Scop. *sensu lato.* Novotná, I., 1968, Experimentalle Bearbeitung der Schotenlänge bei Arabis hirsuta-Komplex, 2, *Folia Geobot. Phytotaxon.*, **3,** 201-216. The taxonomic value of silicule length in the *Arabis hirsuta* complex is reviewed, and it is concluded that it is a valid character which is particularly useful in the analysis of populations.—[D.H.K.]

111/B. BISCUTELLA. Guinea, E., 1968, Iconographia Biscutellorum novarum peninsulae Ibericae (Subseries Pygmeae), *Coll. Bot.*, **7**, 539-549. Descriptions and illustrations are given of a number of species of *Biscutella* from Spain and Portugal.—[D.H.K.]

113. VIOLA. Dizerbo, A. H., 1967, Observation sur Viola odorata L., Viola hirta L. et leur hybride Viola permixta Jord. dans le Massif Armoricain, *Bull. Soc. Bot. Sci. Bretagne*, **42**, 113-124. A study of the geographical distribution, ecology and biology of *Viola odorata* in the Massif Armoricain. Comparisons are made with populations from elsewhere in Europe. It is proposed to provide similar data for *V. hirta* and *V.* × *permixta* in later papers.—[E.B.B.]

113. VIOLA. Kiem, J., 1968, Einige floristische Beobachtungen über Südtiroler Veilchen, *Ber. bayer. bot. Ges.*, **40**, 31-34. Studies on the violets of the southern Tyrol, including *V. odorata*, *V. hirta*, *V. palustris*, *V. riviniana*, *V. reichenbachiana*, *V. reichenbachiana* × *riviniana*, *V. rupestris*, *V. tricolor* and *V. arvensis*.—[D.H.K.]

113. VIOLA. Sorsa, M., 1968, Cytological and evolutionary studies on Palustres Violets, *Madroño*, **19**, 165-179. The following chromosome numbers are reported:—*Viola palustris* L. subsp. *juressi* (K. Wein) Fourn., $n = 24$ (from cultivated plants grown from seed obtained from Portugal); *V. palustris* L. agg., $n = 22, 23$ (from the United States).—[D.H.K.]

115.→ GUTTIFERAE. Schofield, E. K., 1968, Petiole anatomy of the Guttiferae and related families, *Mem. N.Y. bot. Gdn.*, **18** (1), 1-55.

115. HYPERICUM. Robson, N. K. B. & Adams, P., 1968, Chromosome numbers in Hypericum and related genera, *Brittonia*, **20**, 95-106. A comprehensive list of chromosome numbers covering many species of *Hypericum* is provided.—[D.H.K.]

115/1. HYPERICUM ANDROSAEMUM L. Whatman, A., 1967, Tutsan—Economic control of a problem weed, *N.Z. J. Agric.*, **115** (3), 24-27. *Hypericum androsaemum*, an adventive species in New Zealand, has infested many pastures in the Taumarunai area. Control has, however, been obtained by spraying 2, 4, 5-T at 1 gall. in 50 gall. water/acre applied by helicopter between January and March, followed by intensively grazing the area with sheep from June onwards.—[D.H.K.]

122. ELATINE. Schotsman, H. D., 1967, Notes sur Elatine alsinastrum L., 1. *Bull. Centre Rech. Sci. Biarritz*, **6**, 739-747.

123/14. SILENE ALBA (Mill.) E. H. L. Krause. Choudhouri, H. C., 1968, Spontaneous chromosome aberrations in Melandrium, *Can. J. Genet. Cytol.*, **10**, 143-147.

128/1. VACCARIA PYRAMIDATA Medic. Alex, J. F., 1968, Competition between Linseed Flax and Saponaria vaccaria, *Can. J. Pl. Sci.*, **21**, 139-147. Yields of flax (*Linum usitatissimum*) were reduced by competition with 30-37 plants of *Vaccaria pyramidata* per metre^2 in fields on heavy clay in Saskatchewan.—[D.H.K.]

133/1. STELLARIA NEMORUM L. Slim, G. K. & Koopmans, A., 1968, Some data on the karyotypes of Stellaria nemorum L. subsp. nemorum and Stellaria nemorum L. subsp. glochidisperma Murb. in the Netherlands, *Acta bot. neerl.*, **17**, 90-92. Both *Stellaria nemorum* subsp. *nemorum* and subsp. *glochidisperma* occur in the Netherlands. Both are, however, very restricted in distribution. *S. nemorum* subsp. *nemorum* is found in the southern parts of the province of Limburg, while subsp. *glochidisperma* occurs in the neighbourhood of Norg in the province of Drenthe. Both subspecies are diploid with a chromosome number of $n = 26$. The morphology of the chromosomes is described and discussed.—[D.H.K.]

141. ARENARIA. Chable, R., 1968, Contribution à une anatomie comparée du genre Arenaria L., 1. Le problème de l'endodermie. *Bull. Soc. Neuchâtel. Sci Nat.* **91**, 55-74. A well characterised endodermis, found mainly in the sterile shoots and

at the base of the flowering stems that dry up in the autumn, has been identified in most species of *Arenaria* examined. Species treated include *A. serpyllifolia* and *A. balearica*.—[E.B.B.]

149. MONTIA. Pedersen, A., 1968, De underarter af Montia fontana i Danmark, *Bot. tidsskr.*, **63**, 368-371. A study of *Montia fontana* in Denmark has revealed the presence of three subspecies—subsp. *fontana*, subsp. *chondrosperma*, both well distributed, and subsp. *variabilis*, which is apparently confined to western and northern Jutland.—[D.H.K.]

153. AMARANTHUS. Cacciato, A., 1967, Su due nuovi ibridi di Amaranto nei pressi di Roma, *G. bot. ital.*, **101**, 404-405. Two new *Amaranthus* hybrids are reported from the vicinity of Rome. *A. bouchonii* Thell. var. *cacciatoi* Aell. × *patulus* Bert. = *A.* × *aelleni* hybr. nov., and *A. bouchonii* Thell. × *retroflexus* = *A.* × *ralleti* Contré.—[D.H.K.]

153. AMARANTHUS.—See 154.→ CHENOPODIACEAE.

153/1. AMARANTHUS RETROFLEXUS L. Marshall, V. L., Buck, B. & Bell, G. L., 1967, Pigweed (Amaranthus retroflexus): an oxalate containing plant, *Am. J. vet. Res.*, **28**, 888-889. *Amaranthus retroflexus* is shown to possess a very high oxalate content and is consequently dangerous to sheep and cattle.—[D.H.K.]

154.→ CHENOPODIACEAE. Hansen, A. & Pedersen, A., 1968, Chenopodiaceernse og Amaranthaceernes udbredelse i Danmark, *Bot. tidsskr.*, **63**, 205-288. The distributions of the various species of *Atriplex*, *Chenopodium*, *Beta*, *Halimione*, *Salsola*, *Salicornia*, *Bassia* and *Amaranthus* in Denmark are outlined and illustrated by dot maps. It is pointed out that an examination of a microfilm of *Atriplex hastata* in the Linnaean herbarium shows that the name must be considered a nomen ambiguum, and that the correct name for the species appears to be **A. calotheca** (Rafn.) Fr.—[D.H.K.]

154/4. CHENOPODIUM ALBUM L. Brian, R. C. & Cattlin, N. P., 1968, The surface structure of leaves of Chenopodium album L., *Ann. Bot.*, **32**, 609-612.

156. ATRIPLEX. Pedersen, A., 1968, Nogle kritiske, Danske Atriplexarter, *Bot. tidsskr.*, **63**, 289-303. A survey is made of eight critical species of Danish *Atriplex* with notes on their varieties and hybrids. The sea-shore races of the aggregate *A. hastata* are referred to *A. latifolia*, *A. prostrata*, *A. triangularis* and *A. calotheca*, and a new variety *A. triangularis* var. *obtusifolia* is described. Comments are made on *A. patula*, *A. longipes* and *A. glabriuscula*.—[D.H.K.]

157/2. HALIMIONE PEDUNCULATA (L.) Aell. Gehu, J. M., 1968, La persistence de l'Obione pedunculata en baie du Mont-Saint-Michel et en quelques points du littoral du nord de la France. Sa signification biologique, *Monde des Plantes*, **63**, (359), 1-4. Notes on the ecology, phenology and biology of *Halimione pedunculata* in St. Michael's Bay and on the northern coast of France.—[D.H.K.]

162. TILIA. Andonovski, A., 1966, Critical survey of the literature on European Tilia, *God. Zborn. Zemj.-Sum. Fak. Univ. Skopje* (*Sum.*), **19**, 257-267.

163.→ MALVACEAE. Bates, D. M. 1968, Generic relationships in the Malvaceae, tribe Malveae. *Gentes Herb.*, **10**, 117-135.

164. LAVATERA. Fernandes, R., 1968, Contribuiçoes para o conhecimentodo género Lavatera L., 1. Notas sobre algunas espécies, *Coll. Bot.*, **7**, 393-447. A revision of *Lavatera*, with descriptions, synonymy, and a key to the identification of the various species.—[D.H.K.]

168. GERANIUM. Täckholm, V. & Chrtek, V., 1968, Einige neue Arten der Gattung Geranium in der Vereinigten Arabischen Republik (Ägypter), *Preslia*, **40**, 139-142. Among four species of *Geranium* new to Egypt is *G. rotundifolium*. A key is provided to all the species known to occur in the country, these include *G. dissectum* and *G. molle*.—[D.H.K.]

178/1. BUXUS SEMPERVIRENS L. Lancaster, R., 1968, The Common Box in Britain, 1, *Gdnrs' Chron.*, **163** (22), 12-13; 2. *Loc. cit.*, **163** (23), 16-17. In the first part of this paper the history and status of *Buxus sempervirens* in Britain is reviewed, and the commercial uses of its wood described. The second part consists of descriptions of a number of cultivars of the species.—[D.H.K.]

181/1. VITIS VINIFERA L. Bessis, R., 1967, Analyse et interprétation de la variabilité de la longueur des pousses le long du rameau d'un an chez la vigne, *Rev. gén. Bot.*, **74**, 579-587. Physiological studies on the variability of shoot length in *Vitis vinifera.*—[D.H.K.]

183.→ LEGUMINOSAE. Rijven, A. H. G. C., 1968, Randomness in the genesis of phyllotaxis, 1. The initiation of the first leaf in some Trifoliae. *New Phytol.*, **67**, 247-256.

185/2. GENISTA ANGLICA L. Gramuglio, G. & Rosso, R., 1968, Embriologia e cariologia di Genista anglica L. con note fitogeografiche e sistematiche, *G. bot. ital.*, **102**, 207-215. *Genista anglica*, a typical Atlantic species, is known in Italy only from Calabria where it is considered to be a post-glacial Atlantic relic. All Italian material examined possesses ± thick pubescence on the young branches. The chromosome number $2n = 48$ is reported.—[D.H.K.]

190. MEDICAGO. Baum, B. R., 1968, A clarification of the generic limits of Trigonella and Medicago, *Can. J. Bot.*, **46**, 740-749. The main steps in the history of the delimitation of *Medicago* and *Trigonella* are given. The typical Medicagos have been characterized by spirally coiled pods; the typical Trigonellas by cylindrical, straight or curved pods. The cause of the long disagreement is due to the existence of species having flattened or compressed pods in both genera. Such species were considered by most botanists to be intermediate between *Trigonella* and *Medicago.* Some botanists included all these species in *Medicago* whereas others included them in *Trigonella.* Some proposed an intermediate genus, e.g. *Pocockia, Melissitus.* In 1873, Urban suggested the characters of the cotyledons as the only reliable criteria for delimitation between the two genera. New evidence based on floral characters supports Urban's generic concept. A possible parallel evolution of pod shape is assumed to have occurred in both genera.—[Author's summary]

190. MEDICAGO. Tutin, T. G., 1968, Some European species of Medicago, *Coll. Bot.*, **7**, 1163-1166. Descriptions are given of *Medicago prostrata* Jacq., *M. rupestris* Bieb., *M. saxatilis* Bieb., and *M. cancellata* Bieb., all from south-east Europe and Asia Minor. A key is provided to their identification.—[D.H.K.]

190/3. MEDICAGO LUPULINA L. Lammerink, J., 1968, Genetic variability in commencement of flowering in Medicago lupulina L. in the South Island of New Zealand. *N.Z. J. Bot.*, **6**, 33-42.

191. MELILOTUS. Trzcinska-Tacik, H., 1967, Melilotus indica (L.) All. i M. wolgicus Poir. w Polsce, *Fragm. Fl. Geobot.*, **13**, 351-355. *Melilotus indica* found in 1966 as an adventive on dumps at Proszowice, *c.* 39 km. north-east of Cracow, is described and figured. *M. wolgicus* Poir., an eastern European species, was found as an adventive on the railway station of Medyka Rozrzadowa, south-east Poland in 1964, and was discovered again in 1966 on the banks of the river Raba at Cikowice near Bochnia, *c.* 40 km. east-south-east of Cracow.—[D.H.K.]

191/3. MELILOTUS ALBA Medic. Ramarkrishnan, P.S., 1968, Nutrition requirements of the edaphic ecotypes of Melilotus alba Medic., 2. Aluminium and manganese, *New Phytol.*, **67**, 301-308.

192/T. TRIGONELLA.—See 190. MEDICAGO.

193/1. ANTHYLLIS VULNERARIA L.—See 4/1. EQUISETUM HYEMALE L.

195. LOTUS. Grant, W. F. & Zandstra, I. I., 1968, The biosystematics of the genus Lotus (Leguminosae) in Canada, 2. Numerical chemotaxonomy, *Can. J. Bot.*, **46,** 586-589.

195. LOTUS. Chrtková-Zertov, A., 1968, The variability of critical species of Lotus L. in Iran and in the neighbouring countries, 2, *Folia Geobot. Phytotaxon.*, **3,** 99-119. Studies on variation and distribution of *Lotus* in the Near East. A number of species which occur in Britain are included in the account.—[D.H.K.]

195. LOTUS. Zandstra, I. I. & Grant, W. F., 1968, The biosystematics of the genus Lotus (Leguminosae) in Canada, 1. Cytotaxonomy, *Can. J. Bot.*, **46,** 557-583. A morphological and cytological study of *Lotus* in Canada based on living material and the examination of over 600 specimens from Canadian and American herbaria. Five native species are recognised:—*L. denticulatus* (E. Drew) Greene, *L. formosissimus* Greene, *L. micranthus* Benth., *L. pinnatus* Hook. and *L. purshianus* (Benth.) Clem. & Clem., and four introduced species are known:—*L. corniculatus*, *L. krylovii* Schischk., *L. uliginosus* and *L. tenuis*. The species are described and figured and their distribution in Canada is given and illustrated by dot maps. A key is provided to the identification of the various species.—[D.H.K.]

201. OXYTROPIS. Boivin, B., 1967, Etudes sur les Oxytropis DC., 2, *Naturaliste can.*, **94,** 73-78. A review of the variation of four Canadian species of *Oxytropis*, including *O. campestris*. A key is given to the identification of the varieties of the latter species.—[D.H.K.]

206/11. VICIA SEPIUM L. Walsh, F. E. R., 1968, An interesting form of Vicia sepium L. on Duvillaum More Island, Co. Mayo, *Ir. Nat. J.*, **16,** 77-78. In July 1966 the author found a single population of *Vicia sepium* which possessed small terminal leaflets in place of tendrils. The plants were growing on Duvillaum More Island, three miles off the Mullett, Co. Mayo. Attention is drawn to various references in the literature to similar plants. G. C. Druce recorded a closely allied form at Caithness as var. *dunensis*. This is a dwarf prostrate taxon and is fairly strongly pubescent, but herbarium material examined at the British Museum (Nat. Hist.) and Kew revealed that all the specimens so named bore tendrils of some sort. A similar population was recorded from sand dunes near Kincashla Point, Co. Donegal, by Hart in 1908, while Praeger, in 1905, reported a colony on sand dunes on the Mullet, Co. Mayo 'in a dwarf form six inches high and almost devoid of tendrils'.—[D.H.K.]

211. RUBUS. Darrow, G. M., 1968, The cultivated raspberry and blackberry in North America—breeding and improvement, *Am. bot. Mag.*, **46,** 203-218.

211. RUBUS. Davis, H. A., Fuller, A. M. & Davis, T., 1967-68, Contribution towards the revision of the Eubati of Eastern North America, 1. Setosi, *Castanea*, **32,** 20-37; 2, Setosi, *Loc. cit.*, **33,** 50-76. The commencement of a revision of *Rubus* section *Eubati* in Eastern North America, with descriptions, synonymy, and a key to the identification of species.—[D.H.K.]

211/11 (54). RUBUS LACINIATUS Willd. Hansen, A. & Pedersen, A., 1968, Noter om dansk flora og vegetation, 29. Rubus laciniatus Willd., Fliget Brombaer, en art med ukendt oprindelse, *Flora og Fauna*, **74,** 33-35. Notes on *Rubus laciniatus*, a species of unknown origin which is often considered to be an escape from cultivation. It was first recorded from Denmark in 1868, and the present distribution in the country is illustrated by a dot map. In many of its Danish habitats it appears to be of natural origin and it is suggested that Denmark may come within the native range of the species, if indeed it has a native distribution. Finally, it is pointed out that the correct place of description is *Hortus Berolinensis*, etc. **2** (7): tab. 82, with text (1806), and not *Enum. Pl. Hort. Berol.* 550 (1809) as is usually cited.—[D.H.K.]

220. ALCHEMILLA. Hylander, N., 1968, Nya fynd av Alchemilla cymatophylla Juz., *Bot. Notiser*, **121**, 293-296. *Alchemilla cymatophylla* Juz., chiefly confined in Sweden to the Province of Hälsingland, is reported from near Stockholm, the town of Boden in northern Sweden, and from other localities.—[D.H.K.]

225. ROSA. Krzaczek, N., 1967, Materialy rodologiczne z Okrega Sandomiersko-Opatowskiego, *Fragm. Fl. geobot.*, **13**, 475-482. Studies on *Rosa* in the environs of Sandomierz, Opatów and Ozarów, Poland.—[D.H.K.]

225. ROSA. Popek, R., 1967, Róze Gór Pieprzowých kolo Sandomierza, Czesé, 1, *Fragm. Fl. Geobot.*, **13**, 459-474. The first part of a revision of the roses in the area of Góry Pieprzowe near the town of Sandomierz, which possesses the richest rose flora in Poland. Eleven species and a number of new subspecies, varieties and forms are described. *R. dumetorum* Thuill. is predated by the name **R. corymbifera** Borkh.—[D.H.K.]

226/5. PRUNUS CERASUS L. Oldén, E. J. & Nybom, N., 1968, On the origin of Prunus cerasus L., *Hereditas*, 59, 327-345. According to the current theory, the tetraploid sour cherries, *Prunus cerasus*, have originated from the diploid sweet cherries, *P. avium*, through hybridisation between this and the wild growing ground cherry *P. fruticosa* Pall.

Crossing experiments produced results similar to the wild species and support the theory.

The parental species, *P. fruticosa* and *P. avium*, have partially different areas of distribution, The natural distribution of the wild *P. cerasus* corresponds, however, very well with the area where the ranges of the parents overlap in south-east Europe and south-west Asia.

The triploid hybrids which have reduced fertility, are more *fruticosa*-like and appear to correspond to types which have been called *P. mohácsyana* Kárp.—[Authors' summary]

231. AMELANCHIER. Favarger, C. & Correvon, P., 1967, Mise en évidence de 'races chromosomiques' chez l'Amélanchier, *Bull. Soc. Neuchâtel, Sci. Nat.*, **90**, 215-218. The authors show that diploid plants of the species *Amelanchier ovalis* Medic. are growing in the south of France. These plants belong probably to a special meridional 'race'. On the other hand, the plants growing at the foot of the Jura mountains near Neuchâtel are tetraploid. There are a few morphological differences between the two populations. These seem chiefly quantitative.—[Authors' summary, translated by E.B.B.]

232. SORBUS. Hensen, K. J. W., 1967, In Nederland geweekle tussenvormen tussen Sorbus aria en S. torminalis, *Dendroflora*, **4**, 51-60. Studies on the taxa of the *Sorbus latifolia* complex (i.e. intermediates, hybrids and hybrid derivatives between *S. aria* and *S. torminalis*) cultivated in the Netherlands. *S. latifolia* is commonly grown and is usually named *S. latifolia* 'Atrovirens' by Dutch nurserymen though it is doubtful if there is any difference between it and *S. latifolia* from the Forest of Fontainebleau, the type locality for the species.

Hybrids between *S. aria* and *S. torminalis*, the correct name of which is said to be **S. × confusa** Gremli ex Rouy & Comus, and not *S. × vagensis* Wilmott, are also grown in Dutch gardens. This hybrid is very variable and is sold by nurseries under a number of incorrect names, e.g. '*S. micromeles*', '*S. alnifolia*', '*S. latifolia*', '*S. decipiens*' and '*S. mougeotii*'. Forms of the hybrid cultivated at Wageningen are described, and their leaves and fruits are illustrated. It is considered unlikely that true *S. decipiens* has ever been cultivated in the Netherlands.

S. devoniensis '*Theophrasta*', a cultivar originating from England, is sometimes found in Dutch nurseries under the names '*S. Theophrasta*' or *S. aria* 'Theophrasta.'

S. × *dubia* Hedl., a cultivated variety of unknown hybrid origin, presents characteristics of *S. aria*, *S. aucuparia* and *S. torminalis.* It is sometimes grown under the name *S. mougeotii*, which is incorrect.—[D.H.K.]

232/2. Sorbus domestica L. Hadfield, M., 1968, The True Service Tree, *Gdnrs' Chron.*, **163,** (19), 14-15. Notes on *Sorbus domestica*, and on the differences between it and *S. aucuparia.* Illustrations are given of shoots, leaves and fruit.—[D.H.K.]

232/2. Sorbus domestica L. Wittenberger, G., 1968, Sorbus domestica L. im Böhmischen Mittelgebirge, *Ber. bayer. bot. Ges.*, **40,** 61-62.

232/6. Sorbus latifolia (Lam.) Pers. Hensen, K. W. J., 1968, Sorbus latifolia, *Dendroflora*, **5,** 35. The author refers to his earlier paper on *Sorbus* species and hybrids grown in the Netherlands, and points out that it has been established that *S. latifolia* 'Atrovirens' is identical with material of *S. latifolia* from the Forest of Fontainebleau. The correct name for the Dutch plants is, therefore, *S. latifolia* without any cultivar name.—[D.H.K.]

234. Malus. Hucking, C. A., [1967] 1968, Flower and fruit keys to the ornamental crabapples cultivated in the United States, *Baileya*, **15,** 129-164.

238. Umbilicus. Sunding, P., 1968, Notes on the genus Umbilicus DC. (Crassulaceae) in the Canary Islands, *Cuad. Bot.*, **3,** 11-18. A revision of *Umbilicus* in the Canary Islands based on field studies and herbarium specimens. Only two species—*U. heylandianus* Webb & Berth. and *U. horizontalis* (Guss.) DC. occur in the Archipelago. Other names previously used, including *U. rupestris*, which is not present, have been due to misidentification.—[D.H.K.]

239. Saxifraga. Damboldt, J., 1968, Zur Cytotaxonomie der Gattung Saxifraga L., 3, *Willdenowia*, **4,** 43-52. Further studies on various species of *Saxifraga* in the Alps.—[D.H.K.]

239. Saxifraga. Ingwersen, W., 1968, Porphyrion Saxifragas, *Gdnrs' Chron.*, **163** (16), 12-13. Contains descriptions of a number of cultivars of *Saxifraga oppositifolia.*—[D.H.K.]

243/1. Parnassia palustris L. Gadella, T. W. J. & Kliphuis, E., 1968, Parnassia palustris in the Netherlands, *Acta bot. neerl.*, **17,** 165-172. Cytological and morphological studies on Dutch populations of *Parnassia palustris* revealed both diploid and tetraploid plants. Both cytotypes belong to subsp. *palustris*, although the diploid race was confined chiefly to coastal habitats while the tetraploid race was noted only in the provinces of Overijssel and Gelderland.—[D.H.K.]

248/1. Sarracenia purpurea L. Kertland, M. P. H., 1968, Sarracenia purpurea as an introduced plant in Ireland, *Ir. Nat. J.*, **16,** 50-51. The history of *Sarracenia purpurea* in Ireland is reviewed and commented upon. Details are also given of the introduction of the species into the various vice counties. The present Irish vice county distribution is [H.14], H.18, H.19, H.23, H.25 and H.27.—[D.H.K.]

249.→ Lythraceae. Dollon, T. & Hamel, J.-L., 1967, Contribution à l'étude caryo-taxinomique des Lythracées et des Punicacées, *Bull. Mus. natn. Hist. nat., Paris*, **39,** 793-818. A study is made of the nuclear structure and the development of mitosis in several species of the Lythraceae and Punicaeae. In a table of chromosome numbers *Lythrum portula* (L.) D. A. Webb (*Peplis portula* L.) is given as $2n = 10$, *L. salicaria* as $2n = 50, 60$, *L. salicaria* var. *genuina* as $2n = 30$, and *L. hyssopifolia* as $2n = 20$.—[E.B.B.]

254/6. Epilobium adenocaulon Hausskn. Bernard, F. G., 1968, Forme blanche d'Epilobium adenocaulon Haussknecht (Onagraceae), *Naturaliste can.*, **95,** 225. A brief note describing a white-flowered form of *Epilobium adenocaulon* found in Montreal in 1967. It is given the name *f. albiflorum* F. G. Bernard.—[D.H.K.]

256. Oenothera. Rostánski, K., 1968, Próba zasto sowania metody dendry towej w systematyce gatunków rodzaju Oenothera L., *Acta Bot. Soc. Polon.*, **37**, 235-244. A comparison of 18 species of *Oenothera* belonging to three subgenera has been made by means of the dendrite method, involving 30 characters, 22 qualitative traits and 18 quantitative traits.—[D.H.K.]

256/4. Oenothera parviflora L. Cwikiński, E., 1967, Nowy ala Polski gatanek Wiesiolka Oenothera ammophila Focke, *Fragm. Flor. geobot.*, **13**, 51-53. *Oenothera parviflora* was discovered in Poland in 1964. It is a new adventive to the country, and a description is given together with details of associated species.—[D.H.K.]

259/2. Myriophyllum spicatum L. Blackburn, R. D. & Weldon, L. W., 1967, Eurasian Watermilfoil—Florida's new underwater menace, *Hyacinth Contr. J.*, **1967** (6), 15-18. *Myriophyllum spicatum*, an adventive from Eurasia, has recently become established in a number of lakes and reservoirs in Florida and is spreading rapidly. Notes are provided on the differences between this new adventive and two related species commonly found in Florida—*M. brasilense* and *M. heterophyllum.*—[D.H.K.]

259/2. Myriophyllum spicatum L. Steenis, J. H., 1967, Eurasian Watermilfoil, a rapidly spreading water plant, *Hyacinth Contr. J.*, **1967** (6), 18-19. Notes on the spread and distribution of the adventive Eurasian *Myriophyllum spicatum* in the United States. Methods of control by the use of 2, 4-D butoxyethanol ester are recommended.—[D.H.K.]

262. Callitriche. Lawalrée, A., 1968, Callitriche brutia Petagna et C. platycarpa Kützing (Callitrichaceae) en Belgique, *Bull. Jard. Bot. Belg.*, **38**, 123-126. *Callitriche brutia* Pet. (*C. pedunculata* Lamk. & DC.) is reported as new to Belgium. A description of the species is provided, and its differences from *C. platycarpa* are given. The distributions of the two species in Belgium are outlined.—[D.H.K.]

262/3. Callitriche obtusangula Le Gall. Zielonkowski, W., 1968, Die Verbreitung von Callitriche obtusangula Le Gall in Bayern, *Ber. bayer. bot. Ges.*, **40**, 63-65.

269.→ Umbelliferae. Heywood, V. H., 1968, Scanning electron microscopy and micro-characters in the fruits of the Umbelliferae—Caucalideae, *Proc. Linn. Soc.*, **179**, 287-289.

269.→ Umbelliferae. Jermyn, S. T., 1966, The Umbelliferae in Essex. *Nat. N. Essex*, **1964** and **1965**, 6-11. An account of the species of the Umbelliferae found in Essex, with details of their distributions.—[D.H.K.]

269.→ Umbelliferae. Tseng, C. C., 1967, Anatomical studies of flower and fruit in Hydrocotyloideae (Umbelliferae), *Univ. Calif. Publ. Bot.*, **42**, 1-58.

272. Eryngium. Burdet, H.-M. & Miége, J., 1968, Etude caryologique et morphologique d'Eryngium × zabelii Hort. ex Christ, *Candollea*, **23**, 109-120. Chromosome numbers of various species in *Eryngium* sections *Alpina* and *Campestria* are given. European material of *E. campestre* had $2n = 14$ and 28.—[D.H.K.]

288/1. Cicuta virosa L. Tatar, A. & Otlowski, F., 1967, Mass poisoning of cattle with Cowbane (Cicuta virosa L.), *Zycie weteryn*, **42**, 137-140.

294. Pimpinella. Hunkeler, C. & Favarger, C., 1967, Contribution à la cytotaxinomie du genre Pimpinella, *Bull. Soc. Bot. Neuchâtel Sci. Nat.* **90**, 219-239. The study of about 75 individual plants of *Pimpinella major* and *P. saxifraga* has revealed that the basic chromosome number is $n = 10$. In all areas from which material was examined *P. major* proved to be a diploid, but the collective species *P. saxifraga* was found to consist of two chromosome races. These relate to *P. saxifraga* L. *sensu stricto* (diploid) and *P. nigra* Willd. (tetraploid), though some intermediate forms were noted. The chromosome number $2n = 20$ is reported for *P. saxifraga* L. subsp. *alpestris* (Spreng.) Vollmann.—[E.B.B. & D.H.K.]

311. HERACLEUM. McClintock, D., 1968, Giant Hogweeds in Britain, *Gdnrs' Chron.*, **164** (7), 8. The writer points out that there are at least two distinct giant hogweeds cultivated in British gardens and occurring as naturalised escapes. They are designated as Taxon A and Taxon B, and the following details are provided for their separation.

	Taxon A	Taxon B
Duration:	Monocarpic	Perennial
Height:	to 16 ft.	to 8 ft.
No. of stems:	always one	one to many
Leaflets:	two pairs	three pairs
Leaf outline:	deeply and sharply toothed	more sinuate
Leaf colour:	dark green	pale green

Taxon A is frequent, being locally abundant and naturalised in many parts of the British Isles—it is provisionally equated to *H. mantegazzianum.* Taxon B is rare, but there is a fine example in the Oxford Botanic Garden. It occurs also as an abundant weed of rough places in the garden of Buckingham Palace. No morphological differences have been detected between the flowers and fruits of the two, and Taxon B may not necessarily be a distinct species.

H. villosum has been recorded from Mildenhall, Suffolk, and from Oxfordshire, but is now considered to be a form of *H. mantegazzianum. H. persicum* is also probably in cultivation; this is a smaller and more slender species. Hybrids between *H. mantegazzianum* and *H. sphondylium* may occur.—[D.H.K.]

312. TORDYLIUM. Runemark, H., 1968, Studies in the Aegean flora, 13. Tordylium L. (Umbelliferae), *Bot. Notiser*, **121**, 233-258. *Tordylium officinale* L., *T. pestalozzae* Boiss., *T. aegaeum* Run., sp. nov. and *T. hirtocarpum* Cand. have previously been much confused in spite of conspicuous differences in number and length of umbel rays, shape of bracts and bractlets, size of radiating petals, hair types and distribution of vittae in the mericarps. The variation of these as well as in *T. apulum* L. is discussed. Pollen grains of the Aegean species have been investigated. All species can be distinguished on details in pollen morphology, such as the degree of thickenings of the exine in the equatorial zone, and the shape of the apertures. Chromosome numbers, and to a certain extent chromosome morphology have been investigated in the following species: *T. apulum* ($2n = 20$), *T. officinale* ($2n = 18$), *T. pestalozzae* ($2n = 20$), *T. aegaeum* ($2n = 20$), *T. hirtocarpum* ($2n = 8$) and *T. maximum* ($2n = 20$). The only species previously investigated cytologically is *T. maximum* for which the number $2n = 22$ has been reported. Maps of the total distribution are given for *T. pestalozzae*, *T. aegaeum* and *T. hirtocarpum*, as well as a map showing the Aegean distribution for *T. apulum.* A key to all species recorded in the Aegean (i.e. all European species) has been prepared. Descriptions are given of *T. apulum*, *T. officinale*, *T. pestalozzae*, *T. aegaeum* and *T. hirtocarpum.*—[Author's summary]

315/E. ECHINOCYSTIS LOBATA (Michx.) Torr. & Gray. Slavil, B. & Lhotská, M., 1967, Chorologie und Verbreitungsbiologie von Echinocystis lobata (Michx.) Torr. et Gray mit besonderer Berücksichtigung ihrer Vorkommens in der Tschechoslowakei, *Folia Geobot. Phytotaxon.*, **3**, 255-282. The North American species *Echinocystis lobata* (Michx.) Torr & Gray was first noted as a naturalised escape in Europe in România in 1904. Since that time it has spread rapidly, and is now known from Czechoslovakia, Jugoslavia, southern Germany, Hungary, Austria, the U.S.S.R., and most recently from Switzerland where it was recorded in 1953. In Czechoslovakia it is very widespread on river banks and by brook sides where it readily enters with natural communities. These habitats correspond with its native environment in North America. It occurs also on waste and cultivated ground, but rarely persists for very long. The phytosociology, ecology and biology of the species is discussed.—[D.H.K.]

319. EUPHORBIA. Cesca, G., 1967, Osservazioni citotassonomiche su Euphorbia apias L., E. ceratocarpa Ten., E. amygdaloides L., s.l., E. characias L., s.l., *Arch. Bot.* (*Forli*), **43,** 280-290 + 11 plates.

319/15. EUPHORBIA ESULA L. Mitch, L. W., 1967, Control of leafy spurge, field bindweed and western snowberry, *Down to Earth*, **23** (3), 8-11. Notes on control methods used against *Euphorbia esula*, *Convolvulus arvensis* and *Symphoricarpus occidentalis*, in North Dakota in 1966.—[D.H.K.]

325. RUMEX. Duvigneaud, J., 1968, Deux Rumex hybrides de la flore belge, *Bull. Soc. r. Bot. Belg.*, **101,** 37-38. Two hybrids new to the Belgian flora were discovered in 1966: *Rumex* × *digeneus* Beck (*R. conglomeratus* × *hydrolapathum*) and *R.* × *weberi* Fischer-Benzon (*R. hydrolapathum* × *obtusifolius*). A description of each is given with notes on known distribution; both are said to be found in the British Isles.—[E.B.B.]

325/3. RUMEX SCUTATUS L. Korneck, D., 1967, Der Schildampfer (Rumex scutatus L.) auf Bahnschotter, *Hess. Flor. Briefe*, **16,** 17-18. Ecological and phytosociological notes on *Rumex scutatus* in Germany.—[D.H.K.]

330. ULMUS. Endtmann, J., 1967, On the taxonomy of the Central European species of Ulmus, *Arch. Forstwesen*, **16,** 667-672.

334/1. PLATANUS × HYBRIDA Brot. Hadfield, M., 1968, Notes on the London Plane, *Gdnrs' Chron.*, **164** (1), 7-8. The origin, and introduction of *Platanus* × *hybrida* into Britain will probably remain a mystery. The assumed earliest reference to its cultivation in England appears in a list entitled 'Enumeration of the Trees and Shrubs in the Oxford Botanic Garden'; although undated this was probably printed about 1666. The list contains a reference to *Platanus inter orientalum et occidentalum media,* which in the opinion of the writer may refer to a West Indian species of *Platanus.* The reference was, however, noted by A. Henry who concluded, probably incorrectly, that *P.* × *hybrida* was intended. The tree has long been grown in London and many early plantings are on record. There has in the past been some confusion between *P.* × *hybrida* Brot. and *P. occidentalis* L., the latter in fact will not grow to such a size in Britain that it will flower. Contrary to some opinions the seed of *P.* × *hybrida* is quite fertile.—[D.H.K.]

335/3. BETULA NANA L. Birks, J. H. B., 1968, The identification of Betula nana pollen, *New Phytol.*, **67,** 309-314. There are three approaches to the problem of distinguishing the pollen of *Betula nana.* Grain morphology is not considered a reliable criterion. Size measurements alone serve to distinguish *B. nana* pollen from *B. tortuosa*, whilst the grain diameter: pore depth ratio distinguishes *B. nana* from *B. pubescens.* Reliable separation of *B. nana* pollen from tree birch pollen requires both the parameters.—[Author's summary]

336/2. ALNUS INCANA (L.) Moench. Hadfield, M., 1968, The Grey Alder, *Quart. Jl. For.*, **62,** 170-172. Notes on the cultivation of *Alnus incana* in Britain.—[D.H.K.]

339/1. FAGUS SYLVATICA L. Gramuglio, G., 1968, Rinvenimento del Faggio sui Monti Peloritani. *G. bot. ital.*, **102,** 229-230. *Fagus sylvatica* is reported as new to the Peloritani Mountains of Sicily.—[D.H.K.]

339/1. FAGUS SYLVATICA L. Milescu, I., *et al.*, 1967, *Fagul* [Beech-Fagus sylvatica]. Pp. 581. Agro-Silvica, Bucharest. A comprehensive study of the ecology, silviculture, etc., of *Fagus sylvatica.*—[D.H.K.]

349/1. DABOECIA CANTABRICA (Huds.) C. Koch. McClintock, D., 1968, Notes on British Heathers, 4. Genera other than Calluna and Erica, *Heather Year Book*, **1968.** [Pp. 3].

353/1. ARBUTUS UNEDO L. Florit, A. C., 1968, Variaciones Renológicus observadas en Arbutus unedo en tres localidades distintas del Marizo del Tibidabo, *Coll. Bot.* **7,** 207-212.

356. CALLUNA. Chopinet, R., 1968, Les Bruyéres rustiques genres Erica L. et Calluna Salisbury, 1. Bruyéres de printemps, *Rev. hort.* (*Paris*), **140,** 1429-1432; 2. Bruyéres d'été, *Loc. cit.*, **140,** 1464-1470. A detailed catalogue with descriptions, etc., of the cultivars of *Erica cinerea*, *E. vagans*, *E. ciliaris*, *E. tetralix*, *E. terminalis* Salisb., *E.* × *stuartii* Linton, *E.* × *williamsii* Druce, *Calluna vulgaris*, × *Eucalluna bealeana* Krüssm. (*Calluna vulgaris* × *Erica cinerea*).—[D.H.K.]

357. ERICA.—See 356. CALLUNA.

358/2. VACCINIUM MYRTILLUS L. Lawalrée, A., 1966, Les myrtilles blanches de Malmédy, *Cercle Cult. Lib. Reg. Malmédy Bull.*, **14** (3), 10. Notes on *Vaccinium myrtillus* var. *leucocarpum*.—[D.H.K.]

367. PRIMULA. Jermyn, S.T., 1967, The primroses in Essex, *Nat. N. Essex*, **1966,** 9-13. An account of *Primula vulgaris*, *P. veris* and *P. elatior* and hybrids in Essex.—[D.H.K.]

371/1. TRIENTALIS EUROPAEA L. Copińska, I., 1967, Najwyzsze stanowisko siódmaczka (Trientalis europaea L.) w polskich Tatrach, *Fragm. Flor. geobot.*, **13,** 11-14. *Trientalis europaea* is reported from a new locality in a grassland community dominated by *Nardus stricta* in the West Tatra mountains. This is the highest altitude at which the species has been recorded in Poland. The specimens somewhat resembled the dwarf form reported from open Arctic communities of northern Fennoscandia but also had some features of the usual forest form.—[D.H.K.]

372/2. ANAGALLIS ARVENSIS L. Šveřepová, G., 1968, Zur Zytotaxonomie der Art Anagallis arvensis L., *Preslia*, **40,** 141-143. Chromosome counts are given for a number of forms of *Anagallis arvensis* found in Czechoslovakia, all had $2n = 40$.—[D.H.K.]

392. SYMPHYTUM. Fell, K. R. & Peck, J. M., British medicinal species of the genus Symphytum, *Planta Medica*, **16,** 208-216. The nomenclature of three British taxa of *Symphytum—S. officinale*, *S. tuberosum* and *S.* × *uplandicum* is reviewed and the histological features of the leaves of the three are compared. It is concluded that *S. officinale* and *S.* × *uplandicum* cannot be distinguished from each other by this method. *S. tuberosum* may, however, be distinguished by the softer texture of its leaves and by the arrangement of epidermal cells.—[D.H.K.]

392. SYMPHYTUM. Gadella, T. W., 1968, Over paarse en witte Smeerwortels, *Levende Nat.*, **71,** 130-138. Studies on the *Symphytum officinale* complex in the Netherlands.—[D.H.K.]

400. MYOSOTIS. Grau, J., 1968, Cytotaxonomische Bearbeitung der Gattung Myosotis L., 3. Die annuellen Sippen, *Mitt. bot. StSamml., Münch.*, **7,** 17-100. A revision of the annual species of *Myosotis* of Europe, Asia Minor and North Africa with descriptions, synonymy, keys to the identification of species, subspecies and varieties, etc. Data is also provided on pollen and cytology. A number of new combinations are made including **M. ramosissima** Rochel subsp. **globularis** (Samp.) Grau, comb. et stat. nov., based on *M. collina* Hoffm. var. *mittenii* J. G. Baker; material of this has been seen from Dorset, Berkshire and Sussex. *M. discolor* Pers. var. *balbisiana* (Jord.) Wade is given at specific rank as *M. balbisiana* Jord.—[D.H.K.]

400. MYOSOTIS. Grau, J. & Leins, P., 1968, Pollenkorntypen und Sektionsgliederung der Gattung Myosotis, *Ber. dt. bot. Ges.*, **81,** 107-115. Seven types of pollen have been distinguished in the genus *Myosotis*. These can be divided into two main groups. The relationships between pollen types and the taxonomy of the various sections is reviewed and commented upon.—[D.H.K.]

400/1. MYOSOTIS PALUSTRIS (L.) Hill (*M. scorpioides* L.).—See 461/1. LAMIASTRUM GALEOBDOLON (L.) Ehrendorf. & Polatschek.

405/1. CONVOLVULUS ARVENSIS L.—See 319/15. EUPHORBIA ESULA L.

407. CUSCUTA. Bejlin, I. G., 1967, *Bor'ba s povilikami i zarazikhamo.* Pp. 88. Moscow. A study of *Cuscuta* and *Orobanche* species found in the U.S.S.R., with keys to the identification of species of economic importance.—[D.H.K.]

407. CUSCUTA. Silva, A. R. Pinto da, 1968, Mais duas espécies de Cuscuta na flora de Portugal, *Agronomia lusit.*, **29**, 13-24. Two species of *Cuscuta* are reported as apparently new to Portugal—*C. monogyna* Vahl—possibly new also to the Iberian peninsula, and *C. campestris* Yuncker, an American species. The former has been found infesting *Tamarix canariensis* Willd. and *Securinega tinctoria* (L.) Rothm., and the latter, known in the country since 1947, attacks many weeds and cultivated plants, and is particularly aggressive to *Lycopersicon esculentum* and *Capsicum annuum*, and to a lesser degree *Medicago sativa* and *Cucumis melo.* Descriptions are provided for the two species of *Cuscuta.*—[D.H.K.]

409. LYCIUM. Feinbrun, N., 1968, The genus Lycium in the Flora Orientalis region, *Coll. Bot.*, **7**, 359-379. A revision of *Lycium* in the 'Flora Orientalis' region, including descriptions, synonymy, details of exsiccata seen, distributions, ecological data and a key to the identification of the various species.—[D.H.K.]

413/1. SOLANUM DULCAMARA L. Gauhl, E., 1968, Comparative physiological studies on Solanum dulcamara, *Carnegie Inst. Year Book*, **66**, 216-220. Experimental studies on *Solanum dulcamara* from widely separated clones in central and southern Europe. The paper deals mainly with morphological changes induced by different light conditions.—[D.H.K.]

430/18. VERONICA PRAECOX All. Hylmö, B., 1968, En ny lokal för Veronica praecox i Skåne, *Bot. Notiser*, **121**, 296-297. *Veronica praecox* is reported from the parish of V. Karaby, Skåne, Southern Sweden.—[D.H.K.]

440. OROBANCHE.—See 407. CUSCUTA.

440/10. OROBANCHE HEDERAE Duby. Evans, R. E., 1968, Ivy Broomrape, *Proc. Bgham nat. Hist. phil. Soc.*, **21**, 108. Seeds of *Orobanche hederae* collected from the Gower Peninsula, Glamorgan, were planted close to a cultivated plant of *Hedera colchica* C. Koch in a garden at Stratford on Avon, Warwickshire, on 31 August 1966. On 21 June 1967 an inflorescence 4cm. long was noted and shortly afterwards four further inflorescences appeared. It is not known whether all the plants of *O. hederae* originated from a single seed or a number of seeds. Details of the growth rate of the inflorescences are given.—[D.H.K.]

445. MENTHA. Ouweneel, W. J., 1968, Cytotaxonomic studies in the genus Mentha in the Netherlands, *Proc. ned. Akad. Wet., ser. c.*, **71**, 184-188. Cytological investigations were carried out on 148 specimens of Dutch mints, some of which were obtained from botanic gardens, and some from other sources. New chromosome numbers were found for *Mentha arvensis* ($2n = 24$) and *M.* × *dumetorum* Schult. (*M. aquatica* × *arvensis*) ($2n = 72$). Relationships between cytological and morphological aspects are reviewed.—[D.H.K.]

445. MENTHA. Virmani, O. P. & Datta, S. C., 1968, Oil of spearmint, *Perfum. essent. Oil. Rec.*, **59**, 351-362. A study of the chemical oils of the *Mentha spicata* group, with notes on cultivation, oil content, etc. An extensive bibliography is provided.—[D.H.K.]

448. THYMUS. Adena, F., 1968, Twee voor Nederland nieuwe Tijmen, *Gorteria*, **4**, 48-51. *Thymus humifusus* Bernh. ex Reichb. is mentioned as a new species for the Netherlands flora; it was found near Gulpen (prov. Limburg). Moreover the putative hybrid *T. humifusus* × *pulegioides* (*T.* × *schultzei* Ronn. ex Machule) was found there.

T. humifusus may be distinguished from the two other Netherlands species, viz. *T. pulegioides* and *T. serpyllum*, as follows:

1 Flowering stems distinctly angled, hairy on the angles only; plants mostly ± ascending; leaves rather thin *T. pulegioides*
1′ Flowering stems ± terete, hairy all round; plants ± creeping; leaves mostly thicker
  2 Plants forming dense tufts; leaves mostly narrow, elliptic, glabrous above, the nerves prominent beneath; upper calyx teeth nearly as long as broad *T. serpyllum*
  2′ Plants forming rather loose tufts; leaves broader to nearly orbicular, mostly hairy above, the nerves scarcely prominent beneath; upper calyx teeth distinctly longer than broad *T. humifusus*

—(Author's summary)

448. THYMUS. Nègre, R., 1968, Note sur Thymus serpyllum L. dans la flore Pyrénéenne, *Coll. Bot.*, **7,** 895-916. A number of new species of *Thymus* are described from the Pyrénées.—[D.H.K.]

448. THYMUS. Pawlowski, B., 1967, Rozmieszczenie geograficzne kilku macierzanek (Thymus L.) w Polsce i zachodniej ukranie, *Fragm. Flor. geobot.*, **13,** 15-50. The distributions of the nine species and sixteen hybrids of *Thymus* recorded from Poland and the Ukraine are outlined and illustrated by dot maps.—[D.H.K.]

448. THYMUS. Schratz, E. & Cromm, G., 1968, Experimentelle Bastardierung in der Gattung Thymus, 1. F_1-Bastarde, *Planta Medica*, **16,** 294-316. Details are given of experimental crossings between *Thymus vulgaris* L. and various segregates of *T. serpyllum* L. *sensu lato*. In all cases fertile hybrids were obtained.—[D.H.K.]

455. SALVIA. El-Gazzar, A., Watson, L., Williams, W. T. & Lance, G. N., 1968, The taxonomy of Salvia: a test of two radically different numerical methods, *J. Linn. Soc. Bot.*, **60,** 237-250. Forty-one variations in vegetative morphology were examined in a cosmopolitan sample of 100 *Salvia* species by computer using two different methods—Multiclas (a mixed-data method) and Centclas (taxonomically crude, strictly qualitative). The resulting classifications were similar but not identical, and inspection suggests that the differences result largely from taxonomic distortion in the Centclas method.

A new classification of the *Salvias* examined is proposed, fundamentally different from any previous taxonomic treatment.—[D.H.K.]

461/1. LAMIASTRUM GALEOBDOLON (L.) Erhendorf. & Polatschek. Soó, R. & Borhidi, A., 1968, Über einige Formenkreise der Ungarischen und Karpatischen Flora, 12. Myosotis palustris and Lamium galeobdolon, *Acta bot. hung.*, **14,** 154-163. A revision of the subspecies, varieties and forms of *Lamium galeobdolon* (L.) Nath. (adopted in preference to *Lamiastrum galeobdolon*) and *Myosotis palustris* (*M. scorpioides*) in Hungary and the adjacent Carpathian mountains.—[D.H.K.]

471/S. SIDERITIS. Malagarriga, H. T., 1968, Font Quer y el nombre de las plantas sennenianas, *Coll. Bot.*, **7,** 677-695. A critical review of the genus *Sideritis*, in which a number of new combinations are made.—[D.H.K.]

471/S. SIDERITIS. Sventenius, E. R., 1968, El género Sideritis en la flora Macronésica, *Coll. Bot.*, **7,** 1121-1158.

472.→ PLANTAGINACEAE. Tessene, M. F., 1968, Preliminary reports on the Flora of Wisconsin, no. 59. Plantaginaceae—Plantain Family, *Trans. Wis. Acad. Sci. Arts Lett.*, **56,** 231-313. Contains an extensive account of *Plantago*, including a number of species which occur also in Britain, some as adventives. Descriptions, synonymy, illustrations and keys are provided.—[D.H.K.]

475. CAMPANULA. Bielawska, H., 1968, Cytogenetic relationships between lowland and montane species of the Campanula rotundifolia L. group, 2. Tetraploid C. rotundifolia L. s. str. as well as C. polymorpha Witasek and C. scheuchzeri Vill. from Poland, *Acta Soc. Bot. Pol.*, **37,** 261-296.

475. CAMPANULA. Damboldt, J., 1968, Kurzer Nachtrag zur "Zytotuxonomischen Revision der isophyllen Campanulae in Europa", *Bot. Jb.*, **88,** 200-203. A few amendments are given to the author's revision of the Isophyllen Campanulae published in 1965.—[D.H.K.]

475. CAMPANULA. Laane, M. M., 1968, Cyto-ecological studies on Norwegian Campanula species, *Bot. tidsskr.*, **63,** 319-341. Studies on *Campanula* species in Norway have revealed the chromosome numbers $2n = 34$, 68 and 68 + 4 in the *C. rotundifolia* complex. The diploid specimens were closely related to *C. gieseckiana* Vest. subsp. *gieseckiana* in morphology. The tetraploid specimens were referable partly to *C. gieseckiana* Vest. subsp. *groenlandica* Böcher and partly to *C. rotundifolia* L. *sensu stricto*. It is likely that hybrids between the two subspecies of *C. gieseckiana* are also present.

C. persicifolia was found to have $2n = 16$, and *C. rapunculoides*, $2n = 102$.—[D.H.K.]

479/1. JASIONE MONTANA L. Kovanda, M., 1968, Cytotaxonomic studies in the genus Jasione L., 1. Jasione montana L., *Folia Geobot. Phytotaxon.*, **3,** 139-199. Material of 46 samples of *Jasione montana* from various localities in Portugal, France, Holland, Germany, Switzerland, Austria, Poland and the U.S.S.R. was examined. All the material proved to be diploid with $2n = 12$, although the species appeared to show geographically plastic races. The aneuploid number $2n = 14$ is shown to be limited to the var. *litoralis* Fr., which is confined to saline coastal area in northern Europe.—[D.H.K.]

485/12. GALIUM APARINE L. Yeki, K. & Shimizu, N., 1967, Studies in the termination of dormancy in the seeds of cleavers (Galium aparine), 1. Histological and physiological changes during dormancy, *Weed. Res.* (*Japan*), **6,** 26-30.

2. The effects of some chemicals on the breaking of dormancy, *loc. cit.*, **6,** 30-33.

490/1. LINNAEA BOREALIS L.—See 28/4. BOTRYCHIUM MULTIFIDUM (S. G. Gmel.) Rupr.

494. VALERIANELLA. Hadač, E. & Chrtek, J., 1968, Valerianella mixta (L.) Dufr. v Československu, *Preslia*, **40,** 301-303. *Valerianella dentata* auct. Boh. and Slov. contains two distinct species *V. dentata* (L.) Poll. and *V. mixta* (L.) Dufr. The latter is mainly confined to the warmer area of Central Bohemia, Southern Moravia and Southern Slovakia. The differences between the two species are described, and distribution maps based on herbarium material are given.—[D.H.K.]

501.→ COMPOSITAE. Carvalho, E. & Vasconcellos, J. de, 1968, Nota sobre algumas Compositas espontâneas e subspontâneas en Portugal, *Coll. Bot.*, **7,** 1167-1170. Notes on various species of the Compositae adventive in Portugal. These include *Conyza canadensis, Filago apiculata* and *Chamaemelum nobile*.—[D.H.K.]

502. BIDENS. Lhotská, M., 1968, Die Gattung Bidens L. in der Tschechoslowakei, *Folia Geobot. Phytotaxon.*, **3,** 65-98. An account of the distribution of *Bidens* species in Czechoslovakia based on studies carried out between 1962 and 1966. *B. frondosa* L., a North American adventive, was mapped throughout the country. It probably began to spread about the beginning of the present century and is now common in many districts of Bohemia, though it is less frequent in Slovakia. *B. pilosa* L., also from North America, is not hardy in the country and rarely becomes naturalised. *B. radiata* Thuill. is relatively common in Bohemia and Moravia chiefly near stagnant ponds, but is absent from Slovakia. *B. tripartita* and *B. cernua* are relatively common in lowland areas throughout the country.

B. connatu Muhl. & Willd, another North American adventive, is known only from Karviná in Silesia. The history and spread of *B. frondosa*, *B. connata* and *B. pilosa* in mid-Europe is reviewed.—[D.H.K.]

506. Senecio. Palmblad, I. G., 1968, Comparative response of closely related species to reduced competition, 1. Senecio sylvaticus and S. viscosus, *Can. J. Bot.*, **46,** 225-228. A comparison of the reproduction and vegetative responses of *Senecio sylvaticus* and *S. viscosus* to the time and intensity of reduced competition is reported. The two species reacted similarly to thinning in terms of (1) reduced seed production per experimental population and increased production per individual, (2) reduced head production, (3) reduced vegetative dry weight, and (4) increased plant height.

The two species of *Senecio* differed in their flowering. *S. sylvaticus* was capable of increasing the number of seeds per head only if thinning occurred early, whereas the number of seeds per head in *S. viscosus* significantly increased at all thinning periods. Finally, *S. sylvaticus* experienced much heavier mortality than *S. viscosus*.—[Author's summary.]

506/1. Senecio jacobaea L. Coles, P. G., 1967, Ragwort control with picloram, *Proc. 20th N.Z. Weed Pest Control Conf.*, **1967,** 32-36.

514. Filago. Myrzakulov, P., 1968, Notulae de subtribu Filagineae O. Hoffm. Familiae Compositorum, *Bot. Mat. Gerb. Inst. Kazachsk. SSSR*, **1968,** 34-41. Taxonomical and nomenclatural notes on *Filago*, including a number of species also found in Britain.—[D.H.K.]

517. Antennaria. Cronquist, A., 1968, A commentary on specific delimitation in Antennaria, *Am. Midl. Nat.*, **79,** 513-514.

518/1. Solidago virgaurea L. Björkman, O. & Björkman, M., 1968, Carboxydismutase activity in sun and shade ecotypes of Solidago virgaurea, *Carnegie Inst. Year Book*, **66,** 216-220. Studies on various Swedish ecotypes of *Solidago virgaurea*. —[D.H.K.]

518/1. Solidago virgaurea L. Holmgren, P., 1968, Leaf factors affecting light-saturated photosynthesis in ecotypes of Solidago virgaurea from exposed and shaded habitats, *Physiologia Pl.*, **21,** 676-698.

521. Erigeron.—See 522. Conyza.

522. Conyza. Tuyama, T. & Asai, Y., 1967, On the true status of Erigeron canadensis L. var. levis Makino, *J. Jap. Bot.*, **42,** 335-342 & 361-372. *Erigeron canadensis* L. var. *levis* Makino, which has stems and leaves glabrous, and flowers larger than in var. *canadensis*, was first found in Japan in 1919, and has since become widely established in fields and sandy places along the seashores of Western Japan, particularly about large cities. It has been referred to *E. canadensis* L. var. *glabratus* A. Gray, an American taxon which is now regarded as synonymous with *E. pusillus* Nutt., and is inclined to have a more tropical American distribution than *E. canadensis*.

In Japan *E. canadensis* var. *levis* often occurs mixed with other weeds but *E. pusillus* prefers open ground without competition from other weeds.

The identity of the taxon is still open to doubt and needs further study, but it may be indigenous to Japan rather than an introduction from the United States as was previously suspected.—[D.H.K.]

528. Achillea. Oswiecimska, M., 1968, Achillea collina Becker—ein prochamazulenhaltiges Taxon von Achillea millefolium L. s. l., *Planta Medica*, **16,** 201-207. The polymorphic aggregate *Achillea millefolium* L. *sensu lato* comprises several cytotypes, one (*A. collina* Becker, *A. millefolium* L. subsp. *collina* (Becker) Weiss), a tetraploid with $2n = 36$, contains prochamazulene. This substance has not been detected in the hexaploid cytotypes.—[D.H.K.]

532/1. Matricaria recutita L. Karawya, M. S., Awaod, K. E., Svab, J. & Fahny, T., 1968, A histochemical study of Matricaria chamomilla L., *Planta Medica.*, **16**, 166-173.

534/1. Cotula coronopifolia L. Hansen, A. & Pedersen, A., 1968, Noter om dansk flora og vegetation, 31. Nyt om Cotula coronopifolia L., Firkløft, i NV-Jylland, *Flora og Fauna*, **74**, 37. *Cotula coronopifolia* is naturalised in a few ± saline habitats in Denmark. Notes are provided on a number of these localities, all of which are in north-west Jutland. In one locality, Bøvling at Nissum Fjord, the species has been rediscovered after an apparent absence of 40 years.—[D.H.K.]

535/5. Artemisia norvegica Fr. Ryvarden, L. & Kåland, P. E., 1968, Artemisia norvegica Fr. funnet i Rogaland (Forløpig meddelelse), *Blyttia*, **26**, 75-84. *Artemisia norvegica* has been discovered on Storheii, a small mountain in the district of Hjelmeland, *c.* 55 km. north-east of Stavanger. This rare species is now known from two areas in Scotland, the Rogaland and Dovre-Trollheimen areas of Norway, and the northern Urals. The specimens in the new locality morphologically resemble those found in the other Norwegian localities rather than the smaller subsp. *scotica*. Hjelmeland was glaciated in the last Ice Age and various theories are put forward as to how the plant reached the area.—[D.H.K.]

544. Centaurea. Dittrich, M., 1968, Karpologische Untersuchungen zur Systematik von Centaurea und verwandten Gattungen, Teil 2, *Bot. Jb.*, **88**, 123-162 + 4 plates. Further studies on *Centaurea* and related genera.—[D.H.K.]

553/h. Scorzonera hispanica L. Walter, P., 1968, Scorzonera—the black oyster plant, *Gdnrs' Chron.*, **163** (16), 22-23. *Scorzonera hispanica* is similar in appearance to *Tragopogon porrifolius*, but its leaves are greyish to medium dark green, lanceolate, undulate, slightly toothed, more spreading and broader than in the latter species. The flowering stems grow to 3 ft. in height and terminate in solitary yellow flower heads.

It was probably introduced into Britain from Spain about 1576, and was established in cultivation as a garden vegetable by 1633. The species is still widely cultivated and consumed in parts of Europe.—[D.H.K.] *S hispanica* has been found as an adventive in Britain on a number of occasions.—[D.H.K.]

556. Sonchus. Boulos, L., 1968, The genus Sonchus and allied genera in the Canary Islands, *Cuad. Bot.*, **3**, 19-26. A key is provided to the identification of the species of *Sonchus* and allied genera found in the Canary Islands. A number of species also found in Britain are included in the account.—[D.H.K.]

560/1. Taraxacum officinale Weber. Sánchez, R. A., 1967, Some observations about the effect of light on the leaf shape in Taraxacum officinale L., *Meded. LandbHoogesch. Wageningen*, **67** (16), 1-11 + 7 plates. Studies on the effects of light on the leaf shape of *Taraxacum officinale* showed that leaves with rounded leaf blades developed at low light energy values, and leaves with dissected blades at high light energy values.—[D.H.K.]

560/C. Carthamus tinctorius L. Ebert, W. W. & Knowles, P. F., 1968, Developmental and anatomical characteristics of thin-hull mutants of Carthamus tinctorius (Compositae), *Am. J. Bot.*, **55**, 421-430.

560/C. Cosmos bipinnatus Cav. Wilsenach, R., 1967, Flower colour inheritance in Cosmos bipinnatus, *S. Afr. J. Sci.*, **63**, 339-342.

560/V. Verbesina. Coleman, J. R., 1968, A cytotaxonomic study in Verbesina (Compositae), *Rhodora*, **70**, 95-102.

566/1. Butomus umbellatus L. Stuckey, R. L., 1968, Distributional history of Butomus umbellatus (Flowering-Rush) in the Western Lake Erie and Lake St. Clair region, *Michigan Bot.*, **7**, 134-142. The introduction of the European species *Butomus umbellatus* into the Western Lake Erie and Lake St. Clair region, and its subsequent historical spread is reviewed.—[D.H.K.]

572/1. VALLISNERIA SPIRALIS L. El Hadidi, M. N., 1968, Vallisneria spiralis L. in Egypt, *Candollea*, **23**, 51-58. *Vallisneria spiralis* has been found in three different localities in Egypt. It has probably been introduced into the Nile region by migratory birds.—[Author's summary]

600/1. ENDYMION NON-SCRIPTUS (L.) Garcke. Thursby-Pelham, R. C., 1967, Suspected Scilla non-scripta (bluebell) poisoning in cattle, *Vet. Rec.*, **80**, 709-710.

601. MUSCARI. Garbari, F., 1968, Il genero Muscari (Liliaceae): contributo alla revisione citotassonomica, *G. bot. ital.*, **102**, 87-105. Prior to a taxonomic revision of *Muscari* Mill., the problem of various genera, e.g. *Botryanthus* (Kunth) Bak., *Leopoldia* (Parl.) Bak. and *Muscarimia* (Salisb.) Bak., usually included in *Muscari sensu lato* is reviewed.—[D.H.K.]

605/8. JUNCUS INFLEXUS L. Packham, J. R., 1968, The influence of Coleophora on seed production in Juncus inflexus, *Proc. Bgham. nat. Hist. phil. Soc.*, **21**, 109-116. The amount of ripe seed produced by a *Juncus inflexus* population at Kennel Field, Warwickshire, was high in 1963 and 64, low in 1965 and high again in 1966. Infection and destruction of seed by *Coleophora* larvae was considerable in 1963 and 64 but low in the next two years.

In England the number of seeds produced by *J. inflexus* is enormous and the seeds are widely dispersed by various agencies. Fruiting of *J. inflexus* is somewhat erratic and the level of infection by *Coleophora*, of which *C. glaucicolella* is the most important species, also varies considerably. Although the larvae sometimes destroy large numbers of seeds so many remain that the insect does not appear to influence greatly the distribution or success of the plant.—[Author's summary]

607/1. ALLIUM AMPELOPRASUM L. Jones, S. B., Junr., 1968, Allium ampeloprasum L. in Alabama, *Rhodora*, **70**, 303. *Allium ampeloprasum* is recorded as a naturalised adventive in Alabama. It was first noted on roadsides in 1962, and is now increasing and spreading into pastures.

The distribution of the species in the United States is reviewed.—[D.H.K.]

607/3. ALLIUM SCORODOPRASUM L. Westhoff, V., 1968, Slangelook, *Levende Nat.*, **71**, 1-12. An ecological and phytosociological account of *Allium scorodoprasum*.—[D.H.K.]

607/5. ALLIUM VINEALE L. Hansen, A., 1968, Allium vineale var. purpureum endemisk for Ostersøegnene?, *Bot. tidsskr.*, **63**, 373-374. It is suggested that *Allium vineale* L. var. *purpureum* Koch is endemic to the Baltic area.—[D.H.K.]

607/12. ALLIUM URSINUM L. Soják, R., 1968, Rozšíření plemen Allium ursinum L. v Československy, *Preslia*, **40**, 294-300. The distribution of the two subspecies of *Allium ursinum*—subsp. *ursinum* and subsp. *ucrainicum* Kleop. & Oxner in Czechoslovakia is reviewed and illustrated with a map. Some ecological data is also given.—[D.H.K.]

611. LEUCOJUM. Nutt, R. D., 1968, The genus Leucojum, *Q. Bull. alp. Gdn. Soc.*, **36**, 60-66. Notes on some of the species of *Leucojum* in cultivation.—[D.H.K.]

611/1. LEUCOJUM VERNUM L. Růžička, I., 1968, Rozšíření Arnica montana L., Soldanella montana Willd., Leucojum vernum L. a Calamagrostis villosa (Chaix) Gmel. na Československe vysočině, *Preslia*, **40**, 200-216. Notes on the distribution of *Leucojum vernum* and other species in Bohemia and Moravia.—[D.H.K.]

615. SISYRINCHIUM. Ward, D. B., 1968, The nomenclature of Sisyrinchium bermudiana and related North American species, *Taxon*, **17**, 270-276. Five species of *Sisyrinchium* (Iridaceae) are of common occurrence in northeastern North America. A sixth species is endemic to Bermuda. Their rather similar morphology has led to differing applications of the names given to the various species. Examination of materials available to the original authors indicates the correct name for these species to be as follows: *S. angustifolium* Mill. (= *S. graminoides* Bicknell,

S. bermudiana sensu authors), with branched, relatively broad stems, broad leaves and small blue flowers; *S. atlanticum* Bicknell, with branched, narrow stems with many geniculate nodes, narrow leaves, usually drying pale green; *S. arenicola* Bicknell, a provisional name, with branched, narrow stems and few or no geniculate nodes, narrow leaves, drying dark, and often with a fibrous base; *S. mucronatum* Michx., with very narrow leaves, unbranched and non-geniculate stems, often purplish spathes, and large violet flowers; *S. montanum* Greene (= *S. angustifolium sensu* Bicknell), similar but with somewhat broader leaves, larger capsules and green spathes; and *S. bermudiana* L. (= *S. iridioides* Curtis), the coarse, and ornamental, branched, Bermuda endemic.—[Author's summary.]

616. IRIS. Werckmeister, P., 1967, Catalogus Iridis 1967. Namen und Synonyme des Genus Iris. *Deutsche Iris und Liliengesellschafte V Jahrb.* **1967,** Teil 2. Pp. 160. A systematic list of the species of the genus *Iris*, with synonymy and keys to the identification of species.—[D.H.K.]

624.→ ORCHIDACEAE. Edees, E. S., 1967, The wild orchids of Staffordshire, *N. Staffs. J. Field Studies*, **7,** 4-26. A comprehensive account of the species of the Orchidaceae which have occurred in Staffordshire.—[D.H.K.]

624.→ ORCHIDACEAE. Füller, J., 1966, *Malaxis, Hammarbya, Liparis.* Pp. 52. Neue Brehm-Bücherei, Wittenberg-Lutherstadt. Volume 6 of *Die Orchideen Deutschlands*, treating *Malaxis, Hammarbya* and *Liparis.*—[D.H.K.]

626/1. EPIPOGIUM APHYLLUM Sw. Chafford, M., Chafford, C., Desjacquot, M.-J. & Desjacquot, J.-M., 1968, Epipogon aphyllum (Schm.) Swartz à Sallanches (Haute-Savoie), *Bull. Soc. Linn. Lyon*, **37,** 250-254. *Epipogium aphyllum* was discovered in 1967 at Saint-Roch-Sallanches. A detailed description is given of its morphology and biology with a note on its general distribution and a more detailed account of its occurrence in France.—[D.H.K.]

627/1. SPIRANTHES SPIRALIS (L.) Chevall. Bruna, M., 1968, Spiranthes spiralis (L.) Chevall. Portret van een orchidee, *Natuur-Hist. Maanblad*, **57,** 32-35.

627/2. SPIRANTHES AESTIVALIS (Poir.) Rich. McClintock, D., 1968, Britain's vanished orchid, *Country Life*, **1968** (July 11), 73. *Spiranthes aestivalis* was first discovered in the British Isles at St. Ouens Pond, Jersey, by C. C. Babington in July 1837. In 1840 it was found near Lyndhurst in Hampshire. During 1854 it was recorded from Bewdley, Worcestershire, but the specimen proved to be an aberrant form of *Gymnadenia conopsea*; it has also been erroneously recorded from S. Devon. Finally in 1862 it was gathered at the Grand Mare, Guernsey by H. Trimen. The species was last seen in the Channel Islands in 1928, and in the Lyndhurst, New Forest, locality in 1961. It is concluded that it is now extinct in the British Isles. Collectors appear to have played a major part in its eradication, as there are no less than 236 specimens, some with corms, at three of the major national herbaria.—[D.H.K.]

640. OPHRYS. Hilgers, J. H. M., 1967, Des achteruitgang van de Orchidaceae in Zuid-Limburg, 1, *Natuur-Hist. Maanblad*, **56,** 138-141. Notes on *Ophrys insectifera* and *O. apifera* in South Limburg, Holland, with particular emphasis on the fluctuation of the numbers of plants in specific habitats in different years.—[D.H.K.]

641. HIMANTOGLOSSUM. Nelson, E., 1968, *Monographie und Ikonographie der Orchidaceen—Gattungen Serapias, Aceras, Loroglossum, Barlia.* Pp. 79 + Atlas, 36 maps + 8 maps. E. Nelson, Chernex-Montreux, Switzerland. Price S. fr. 173.75. A revision of *Serapias, Aceras, Loroglossum* (= *Himantoglossum*) and *Barlia*, with descriptions, keys to the identification of species, notes on variation, and the distributions of the various species, details of hybridisation, etc.—[D.H.K.]

643/1. DACTYLORHIZA FUCHSII (Druce) Soó. Hansen, A. & Pedersen, A., 1968, Noter om dansk flora og vegetation, 30. Udbredelsen af Dactylorchis fuchsii (Druce) Verm., Skov-Gøgeurt, i Danmark, *Flora og Fauna*, **74**, 35-37. The distribution of *Dactylorhiza fuchsii* in Denmark is reviewed and illustrated by a dot map. The species is chiefly found in woods and thickets on damp calcareous soils in the south-eastern part of the country.—[D.H.K.]

643/2. DACTYLORHIZA MACULATA (L.) Soó. Tournay, R., 1968, Dactylorhiza maculata (L.) Soó en Belgique, *Bull. Soc. r. Bot. Belg.*, **101**, 323-326. The nomenclature of the subspecies and varieties of *Dactylorhiza maculata* found in Belgium is revised. *D. maculata* (L.) Soó subsp. *ericetorum* (E. F. Linton) P. F. Hunt & Summerhayes, is retained under *D. maculata* (L.) Soó var. *praecox* (Webster) Soó, based on *Orchis maculata* L. var. *praecox* Webster (*British Orchids*, edition 1 (1883)).—[D.H.K.]

643/5. DACTYLORHIZA PURPURELLA (T. & T. A. Stephenson) Soó. Hadley, G. & Harvais, G., 1968, The effect of certain growth substances on asymbiotic germination and development of Orchis purpurella, *New Phytol.*, **67**, 441-445.

643/7. DACTYLORHIZA TRAUNSTEINERI (Sauter) Soó. Dijkstra, S. J., 1968, Dactylorchis traunsteineri, Smalbladige Orchis, *Natuur-Hist. Maanblad*, **57**, 9-11. Notes on *Dactylorhiza traunsteineri*, which is reported as new to the Dutch flora. —[D.H.K.]

644. ACERAS.—See 641. HIMANTOGLOSSUM.

649/2. ARUM ITALICUM Mill. Gunning, B. A., 1967, Control of Italian Arum, *Proc.* 20*th N.Z. Weed Pest Control Conf.*, **1967**, 37-39. *Arum italicum* occurs as a naturalised garden escape in New Zealand, and though not a serious weed it spreads slowly and is difficult to control. Various control measures are suggested. —[D.H.K.]

650.→ LEMNACEAE. Clark, H. L. & Thieret, J. W., 1968, The duckweeds of Minnesota, *Michigan Bot.*, **7**, 67-76. The species of Lemnaceae found in Minnesota are *Spirodela polyrhiza* (L.) Schleid. (*Lemna polyrhiza* L.), *Lemna minor*, *L. trisulca*, *Wolffia columbiana* Karst. and *W. punctata* Griseb. These are described and figured, and a key is given to their identification.—[D.H.K.]

650. LEMNA. Jovet, P. & Jovet-Ast, S., 1967, Floraison, fructification, germination du Lemna valdiviana au Lac Marion (B.P.), *Bull. Centre Rech. Sci. Biarritz*, **6**, 729-734. Notes on the germination, flowering and fruiting of the American *Lemna valdiviana* Viv., naturalised as an adventive in southern France.—[D.H.K.]

653. TYPHA. Fiala, K. & Jankovská, V., 1968, Typha laxmannii Lepech.—nový druh československé květeny, *Preslia*, **40**, 192-197. *Typha laxmannii* Lepech. is reported as new to Czechoslovakia. The species is described, its distribution outlined, and a key is provided to separate it from other species of *Typha*.—[D.H.K.]

653. TYPHA. Briggs, B. G. & Johnson, L. A. S., 1968, The status and relationships of the Australasian species of Typha, *Contr. New South Wales Nat. Herb.*, **4**, 57-69. Previous treatments of *Typha* in Australasia have usually referred all material to *T. angustifolia* or to *T. angustifolia* and *T. brownii* Kunth (*T. angustifolia* L. var. *brownii* (Kunth) Kronf.), or to *T. muelleri* Rohrb. The present study has shown that *T. angustifolia* is a north temperate species and is not present in Australasia. Two native species are recognised—*T. domingensis* Pers., widespread in tropical and warm zones throughout the world, and *T. orientalis* Presl. The latter was originally described from the Philippines but should include Australian material previously referred to *T. muelleri*. *T. latifolia* is naturalised in Tasmania, and possibly also in New South Wales. Descriptions and synonymy of the species are provided together with a key to their identification.—[D.H.K.]

654.— CYPERACEAE. Kukkonen, I., 1967, Gedenken und Probleme zur Systematik der Familie Cyperaceae. Eine Zusammenfassung, *Aquilo, ser. Bot.*, **6**, 18-42.

656. ELEOCHARIS. Strandhede, S.-O., 1966, *Studies in European Eleocharis Subser. Palustres.* Pp. 10. Lund. A short survey of the investigations on European *Eleocharis*, subser. *Palustres*, previously published by the author in *Hereditas* and *Opera Botanica* in 1965.—[D.H.K.]

656. ELEOCHARIS. Strandhede, S.-O. & Dahlgren, R., 1968, Drawings of Scandinavian Plants, 9-10. Eleocharis R.Br., *Bot. Notiser*, **121**, 1-10. Drawings and descriptions are given of **Eleocharis mammilata** Lindb. F. subsp. *mammilata* and subsp. **austriaca** (Hayek) Strandh. (*E. austriaca* Hayek), *E. palustris* subsp. *palustris* (subsp. *microcarpa* Walters) and subsp. *vulgaris* Walters (*E. intermedius* Thuill.).

The distributions of the various taxa in Scandinavia and elsewhere are reviewed.

11-12. Eleocharis R.Br., *Loc. cit.*, **121**, 146-152. Descriptions and drawings are provided of *Eleocharis uniglumis* (Link) Schult. subsp. *uniglumis* var. *uniglumis*, var. *fennica* (Palla) Hyland., var. *vestergrenii* Hyland., var. *septentrionalis* (Zinserl.) Strandh. (*E. septentrionalis* Zinserl.) and subsp. *sterneri* Strandh.

The distributions of the subspecies and varieties in Scandinavia and elsewhere are given.—[D.H.K.]

663/31. CAREX FLACCA Schreb. Smith, D. L., 1968, The growth of shoot apices and inflorescences of Carex flacca Schreb. in aseptic culture, *Ann. Bot.*, **32**, 361-370.

663/52. CAREX BIGELOWII Torr. ex Schwein. Holub, J., 1968, Remarks on the taxonomy and nomenclature of the Carex bigelowii complex, *Folia Geobot. Phytotaxon.*, **3**, 183-192. The *Carex bigelowii* complex comprises a group of taxa distributed over the whole Arctic region and in the mountains of the temperate zone. *C. bigelowii* Torr. ex Schwein. was described from the White Mountains in the eastern part of the United States, and a study of material from there and from Central Europe, the British Isles and the Fennoscandinavian mountains reveal significant morphological differences between the North American and European taxa. The latter is accordingly described as **C. bigelowii** Torr. ex Schwein. subsp. **nardeticola** Holub, subsp. nov. Taxa closely related to the new subspecies are known from Central Siberia and the Arctic Region.

The differences between the N. American and European taxa are given in the following table:—

	N. American	European
Height of plant	20-40 cm.	10-30 cm.
Leaves	2-4 mm. broad, relatively long pointed	3-6 mm. broad, often rather abruptly pointed
Stems	± Slender, 1-1·3 mm. in diam., with one well developed stem leaf	Stiff, stout, 1·3-2·0 mm. in diam., normally without stem leaves
Inflorescence	3-7 cm. long, spikes not forming capitate cluster	2-5 cm. long, spikes contiguous, often capitately clustered
Bracts	leaf-like, 3-7 cm. long, longer than their spikes, sometimes also longer than the inflorescence	normally setaceous, 4-5 cm. long, shorter than their spikes, not reaching the top of the inflorescence
Male spike	normally long pedunculate, the base not reached by female spikes: peduncle ± 2 cm. long, slender, linear-cylindrical, contracted at both ends 1-2·5 × 0·2-0·4 cm.	usually ± sessile, rarely pedunculate, the base reached by female spikes: peduncle ± 0·5 cm. long, stout, oblanceolate to elliptico-ovate 0·9-1·7 × 0·3-0·6 cm.

	N. American	European
Female spikes	(2) 3-4 (5), narrow, ± lax, linear-cylindric 1·5-3·5 × 0·3-0·5 cm. The lowest spike usually pedunculate, peduncle 1-3 cm. long.	2-3 (4), stout, dense, oblong-cylindric 0·9-2·5 × 0·3-0·6 cm. The lowest spike (not including occasionally occurring remote basal spike) only occasionally distant and then shortly pedunculate
Beak of the utricle	indistinct	very short

—[D.H.K.]

663/52. CAREX BIGELOWII Torr. ex Schwein. Schultz-Motel, W., 1968, Uber Carex bigelowii in Mitteleuropa, *Willdenowia*, **4,** 325-328. The central European *Carex rigida* Gooden. is considered to be a subspecies of *C. bigelowii* and is accordingly described as *C. bigelowii* Torr. ex Schwein. subsp. *rigida* (Gooden.) W. Schultz-Motel, stat. nov.—[Author's summary]

664.→ GRAMINEAE. Davidsson, I., 1968, Tvö ilmgrös, *Náttúrufraedingurinn*, **37,** 219-220. Notes on *Anthoxanthum odoratum* and *Hierochloe odorata* as sources of coumarin.—[D.H.K.]

664.→ GRAMINEAE. England, F., 1968, Competition in mixtures of herbage grasses, *J. Appl. Ecol.*, **5,** 227-242.

664.→ GRAMINEAE. Hubbard, C. E., 1968, *Grasses: A Guide to their structure, identification, uses and distribution in the British Isles.* Revised edition. Pp. 463. Penguin Books Ltd., Harmondsworth, Middlesex. Price 10/-. A second edition of Dr C. E. Hubbard's excellent monograph on British grasses which was first published in 1954. As in the original edition detailed descriptions and drawings are given, with keys to the identification of species, etc. Additional species in the new edition are *Bromus benekenii*, *Nardurus maritimus*, *Puccinellia capillaris* and **Spartina anglica** C. E. Hubbard.—[D.H.K.]

664.→ GRAMINEAE. Jírásek, V., 1967, Verwendung der Gynoeceums—Morphologie von Gräsern (Poaceae) in ihrer Taxonomy, *Nov. Bot. Hort. Bot. Univ. Prag.*, **1967,** 11-26.

664.→ GRAMINEAE. Lundqvist, A., 1968, The mode of origin of self-fertility in grasses, *Hereditas*, **59,** 413-426.

664.→ GRAMINEAE. Parks, O. J. C. & Henderlong, P. R., 1967, Germination and seedling growth rate of ten common turf grasses, *Proc. W. Va. Acad. Sci.*, **39,** 132-140. Among grasses included in this study were *Lolium perenne*, *L. multiflorum*, *Festuca arundinacea*, *Poa pratensis* (three strains), *Festuca rubra*, *F. rubra* subsp. *commutata* and *Agrostis stolonifera*. *Lolium perenne* and *L. multiflorum* germinated most rapidly, followed closely by *F. arundinacea*. A strain of *Poa pratensis* showed the slowest germination rate.—[D.H.K.]

664.→ GRAMINEAE. Prat, H. & Vignal C., 1968, Utilisation des particularités de l'épiderme pour l'identification et la recherche des affinités des Graminéas, *Bol. Soc. Argent. Bot.*, **12,** 155-166.

664.→ GRAMINEAE. Shutova Z. P., 1968, The agrobiological study of meadow grass, perennial rye grass and marsh bent grass collections under the Leningrad district collections, *Bull. Appl. Bot. Genetics Pl. Breeding*, **38,** 88-117.

664.→ GRAMINEAE. Smoliak, S. & Johnston, A., 1968, Germination and early growth of grasses at four root-zone temperatures, *Can. J. Pl. Sci.*, **48,** 119-127. Six native Canadian grasses, including *Koeleria cristata*, and six introduced species including *Bromus inermis*, *Festuca rubra* and *Dactylis glomerata* were germinated and grown for 90 days at root-zone temperatures of 7, 13, 18 and 27°C.

In general the introduced species were superior to the native species in both rate and percentage of germination. The early growth and establishment of introduced species appeared to be better than that of native species.—[D.H.K.]

664.→ GRAMINEAE. Whitcombe, C. E. & Roberts, E. C., 1967, Effects of surfactants on growth of turf grasses, *Proc. Am. Soc. hort. Sci.*, **90,** 420-426. Studies on the effects of surfactants on *Agrostis tenuis*, *A. stolonifera* and *Poa pratensis.*—[D.H.K.]

665/1. PHRAGMITES AUSTRALIS (Cav.) Steud. (*P. communis* Trin.). Walker, J. M. & Waygood, E. R., 1968, Ecology of Phragmites communis, 1. Photosynthesis of a single shoot *in situ*, *Can. J. Bot.*, **46,** 549-555.

670. FESTUCA. Sulinowski, S., 1967, Interspecific and intergeneric hybrids in grasses of the Festuca and Lolium genera, *Genet. Polon.*, **8,** 17-30. Experimental crosses described include *Festuca pratensis* × *gigantea*, *Lolium multiflorum* × *temulentum*, *L. multiflorum* × *Festuca pratensis*, *L. multiflorum* × *Festuca gigantea*, *L. perenne* × *Festuca pratensis*, *L. perenne* × *Festuca arundinacea* and *L. perenne* × *Festuca gigantea.*—[D.H.K.]

670/2. FESTUCA ARUNDINACEA Schreb. Hicks, D. H. & Mitchell, K. J., 1968, Flowering in pasture grasses—1. Interactions of day length and temperature on inflorescence emergence for Festuca arundinacea Schreb. variety Manade, *N.Z. J. Bot.*, **6,** 86-93.

670/2. FESTUCA ARUNDINACEA Schreb. Robson, M. J., 1967, A comparison of British and North African varieties of tall fescue (Festuca arundinacea), 1. Leaf growth during winter as affected by temperature and daylight, *J. Appl. Ecol.*, **4,** 75-84.

670/2. FESTUCA ARUNDINACEA Schreb. Robson, M. J. & Jewiss, O. R., 1968, A comparison of British and North African varieties of tall fescue (Festuca arundinacea), 2. Growth during winter and survival at low temperatures, *J. Appl. Ecol.*, **5,** 179-190.

3. Effects of light, temperature and day length on relative growth rate and its components, *Loc. cit.*, **5,** 191-204.

670/6. FESTUCA RUBRA L. Auquier, P., 1968, Festuca rubra L. subsp. litoralis (G. F. W. Mey.) Auquier: morphologie, écologie, taxonomie, *Bull. Jard. Bot. Nat. Belg.*, **38,** 181-192.

670/6. FESTUCA RUBRA L. Farragher, M. A., 1968, Festuca rubra (L.) var. multiflora (Hoffm.) Wallr. in Ireland, *Ir. Nat. J.*, **16,** 32-34. *Festuca rubra* var. *multiflora* is reported from the Enniskerry area of Co. Wicklow. It is new to Ireland, and an account of its morphology is given.—[D.H.K.]

671. LOLIUM.—See 670. FESTUCA.

671/1. LOLIUM PERENNE L. Ahloowaliu, B. S., 1968, Chromosome association and fertility in tetraploid ryegrass, *Genetica*, **38,** 471-484.

671/1. LOLIUM PERENNE L. Troughton, A., 1968, Influence of genotype and mineral nutrition on the distribution of growth within plants of Lolium perenne L. grown in soil, *Ann. Bot.*, **32,** 411-423.

676. POA. Filatova, N. S., 1968, De L. Kazachsteniae notae Systematicae, *Bot. Mat. Gerb. Inst. Kazachsk. SSSR*, **1968,** 24-29. Systematic notes on a number of species of *Poa*, including *P. bulbosa*, *P. trivialis*, *P. nemoralis*, *P. angustifolia* and *P. alpina.*—[D.H.K.]

676. POA. Scholz, H., 1968, Systematik und Verbreitung einiger Taxa der Gattung Poa, Sektion Ochlopoa in Mittelmeergebiet, *Ber. dt. bot. Ges.*, **81,** 17-21. Specimens of *Poa annua* from S. Europe, well marked by lemmas provided with hairs on the lower parts, besides the nerves, and with a shorter life span than subsp. *annua*, are referred to subsp. *pilantha* (Rönniger) H. Scholz, stat. nov. (*P. annua* L. var. *pilantha* Rönniger).

P. maroccana Nannfeldt, previously known only from N. Africa, is now known to occur in Spain.—[D.H.K.]

676. Poa. Serbănescu, G., 1967, Poa romanica Prod. si pozitia ei taxomică, *Studii şi Cercetări de Biology seria Botanica*, **19**, 23-31. A review of *Poa romanica* Prodan, part of the *P. pratensis* complex. A table shows the supposed distinguishing characters of *P. pratensis*, *P. sterilis* Bieb. and *P. romanica* Prodan, and it is concluded that *P. romanica* is conspecific with *P. sterilis*, and that the name should be treated as a synonym of the latter species.—[D.H.K.]

678/1. Dactylis glomerata L. Knights, R. & Yates, N. G., 1968, The *in vitro* digestibility of parents and hybrids of cocksfoot (Dactylis glomerata L.), *Aust. J. agric. Res.*, **19**, 373-380.

680. Briza. Rosengurtt, B., Arrillagade Maffei, B. R. & Izaguirre de Artucio, P., 1968, Sinopsis de Briza [Gramineae] del Uruguay y notas taxonomicas sobre otras especies de este genero, *Bol. Univ. Republ. Fac. Agron.* (*Montevideo*), **105**, 3-34. A revision of *Briza* in Uruguay, with descriptions, synonymy, keys, etc. A number of species which have occurred as adventives in Britain are included.—[D.H.K.]

683. Bromus. In my abstract on *Bromus pseudosecalinus* P. Smith, sp. nov., based on material provisionally referred to *B. secalinus* var or f. *hirtus* (*Proc. bot. Soc. Br. Isl.*, 7, 453. (1968)). I referred to the fact that there were numerous records of *B. secalinus* var. or f. *hirtus* from many parts of Britain. Dr. Smith has rightly pointed out that the taxon to which I referred was var. *hirtus* (F. Schultz) Aschers. & Graebn., which is certainly no more than a minor variant of typical *B. secalinus*. *B. pseudosecalinus* is based on material provisionally referred to *B. secalinus* var. or f. *hirtus* kindb.—[D.H.K.]

685. Agropyron.—See 686. Elymus.

686. Elymus. Runemark, H. & Heneen, W. K., 1968, Elymus and Agropyron, a problem of generic delimitation, *Bot. Notiser*, **129**, 51-79. The tribe Triticeae Dumort. (Hordeae Berth.) has been divided into a number of entities, which are morphologically distinct and may represent main lines of evolution within the tribe. The subdivision of one of these entities, the *Elymus* group, consisting of *Elymus s. lat.* and *Agropyron* Gaertn. *s. lat.* is discussed on the basis of morphologic, anatomic and cytologic data. The division of the *Elymus* group into 13 genera proposed by Nevski is shown to be inappropriate both from a morphologic and an evolutionary point of view. The species within the *Elymus* group have been referred to *Agropyron* if the spikelets are solitary and to *Elymus* if they are placed in pairs or larger numbers at each node. The division is not very distinct. Thus, in some species individuals with solitary as well as with paired spikelets occur. In other species only the spikelets in the middle part of the spike are paired. Both from morphologic, anatomic and cytologic points of view it is evident that several species in *Agropyron* have their closest relatives in *Elymus* and vice versa. In reality the genera *Elymus* and *Agropyron* only represent different levels in the reduction of a paniculate inflorescence. The perennial species, therefore, must be united to a single genus *Elymus* L. The annual species of *Agropyron* seem to be distinct enough to be kept as a separate genus, *Eremopyrum* Jaub. et Spach. They are morphologically characterized by basally connected glumes and cytologically by a chromosome structure unique within the Triticeae. On account of the shape of the palea the annual species of *Elymus* (= *Taeniatherum* Nevski) must be removed from the *Elymus* group and transferred to the *Hordeum* group.—[Authors' summary]

690/1. Gaudinia fragilis (L.) Beauv. Farragher, M. A., 1968, Gaudinia fragilis (L.) Beauv.—another station, *Ir. Nat. J.*, **16**, 53. *Gaudinia fragilis* is reported from trodden margins of a relatively new ley at Lombardstown, Co. Cork.—[D.H.K.]

692. AVENA. Cherry, M., 1968, How to catch and how to kill wild oats, *Farmer & Stock Breeder*, **82** (4078), 48-49. A review of the control methods for combatting *Avena fatua* and *A. ludoviciana*.—[D.H.K.]

692. AVENA. Gervais, C., 1968, Notes de cytotaxinomie sur quelques Avena vivaces, *Bull. Soc. Neuchâtel. Sci. Nat.*, **91**, 105-117. Chromosome numbers are reported for a number of species of *Avena* (including *Helictotrichon* Bess. and *Avenochloa* Holub). *A. filifolia* Lag. *sensu lato* had $2n = 14$ and 84. It seems probable that the number $2n = 14$ refers to *A. fallax* Roem. & Schult., while $2n = 84$ agrees with *A. filifolia* Lag. *sensu stricto*.

In *A. bromoides* Gouan individuals with $2n = 28$ and $2n = 42$ were encountered in addition to previously known diploids. Likewise in *Helictotrichon pratense* two races were found, one with $2n = c.98$, the other with $2n = c.112$, the third race with $2n = 126$ chromosomes being well known.—[E.B.B.]

692/1. AVENA FATUA L. Bowden, B. A. & Friesen, G., 1967, Competition of wild oats (Avena fatua) in wheat and flax, *Weed Res.*, **7**, 349-359.

693. HELICTOTRICHON.—See 692. AVENA.

698/1. CORYNEPHORUS CANESCENS (L.) Beauv. Sebbah, M., 1967, Nature du xérophytisme de Corynephorus canescens (P.B.), *Bull. Soc. Hist. nat. Toulouse*, **103**, 138-159. A detailed and diagrammatically illustrated account of leaves and roots of *Corynephorus canescens* which reveals its ability to withstand dehydration. —[E.B.B.]

701/3. AGROSTIS TENUIS Sibth. McNeilly, T. & Bradshaw, A. D., 1968, Evolutionary processes in populations of copper tolerant Agrostis tenuis Sibth., *Evolution*, **22**, 108-118. Studies on populations of *Agrostis tenuis* from disused copper mines and from adjacent copper free pastures in North Wales and Ireland showed that all populations from the former habitats had copper tolerance but plants taken from populations growing in uncontaminated sites as little as 15½ metres from contaminated areas showed absence of copper tolerance. The genetics of both population types are reviewed at length.—[D.H.K.]

713. PHALARIS. McWilliam, J. R., 1968, The nature of the perennial response in Mediterranean grasses, 2. Senescence, summer dormancy and survival in Phalaris, *Aust. J. Agric. Res.*, **19**, 399-409. Studies on the adaptation of *Phalaris tuberosa* to summer drought.—[D.H.K.]

713. PHALARIS. McWilliam, J. R. & Kramer, P. J., 1968, The nature of the perennial response in Mediterranean grasses, 1. Water relations and summer survival in Phalaris, *Aust. J. Agric. Res.*, **19**, 381-395. The important factor in the summer survival of *Phalaris tuberosa*, a perennial Mediterranean species, is its deep root system which is able to supply water to the dormant culms at the soil surface. The related annual, *P. minor*, is unable to exploit subsoil moisture and dies as soon as the superficial moisture is exhausted.—[D.H.K.]

716/p. SPARTINA PECTINATA Link. Boyle, P. J., 1968, Preliminary account of Spartina pectinata Link new to Ireland, *Ir. Nat. J.*, **16**, 74-75. The North American species *Spartina pectinata* Link is recorded as naturalised in the grounds of Costelloe Lodge, *c.*20 miles west of Galway. The species is described and an account given of its Irish habitat together with details of associated species. It is suspected that it was originally planted for ornamental purposes. Elsewhere in Europe *S. pectinata* is known to be naturalised at the head of the Adriatic Sea in Northern Italy and at Trieste.—[D.H.K.]

717. CYNODON. Jair, S. K., 1968, The genus Cynodon Rich. ex Pers. in India, *Bull. Bot. Survey of India*, **9**, 134-151. A revision of *Cynodon* in India, with descriptions, synonymy and keys. Several species which have occurred as adventives in Britain are included in the account.—[D.H.K.]

718/1. Echinochloa crus-galli (L.) Beauv. Arai, M. & Matsunaka, S., 1966, Control of barnyard grass in paddy fields in Japan, *Jarq. Japan. Agric. Res. Quart.*, **1966** (1), 5-9. *Echinochloa crus-galli* is the most serious weed in rice fields in Japan. The biology, physiology and ecology of the species is reviewed. Control can be effected to some extent by ploughing and by the time of the planting of the rice crop. Good control can be obtained by the use of granular PCP.—[D.H.K.]

719/c. Digitaria ciliaris (Retz.) Koel. Nakazawa, A. & Sano, H., 1967, Ecological changes of Digitaria adscendens Henrard in growing wheat or barley, 1. The effect of light and temperature, *Weed Res. (Japan)*, **6**, 34-38.

720/S. Stipa. Martinovský, J. O. & Scholz, H., 1968, Stipa bavarica—eine neue Fedegrasart, 13. Beitrag zur Kentnis der europäischen Federgrassippen, *Willdenowia*, **4**, 317-324. *Stipa bavarica* Mart. & Scholz, sp. nov., is described from Bavaria. Part of the *S. pennata* complex, it is clearly related to *S. pulcherrima* C. Koch.—[D.H.K.]

720/S. Stipa. Scholz, H., 1968, Die Artengruppe Stipa pennata L. in Frankreich, in der Schweiz und angrenzenden Gebieten, *Willdenowia* **4**, 299-315. The *Stipa pennata* complex is represented in France and Switzerland by the species *S. iberica* Martinovský, *S. eriocaulis* Borbás, *S. joannis* Celakovský, *S. stenophylla* (Czein ex Lindm.) Trautv. Besides *S. joannis*, *S. paradoxa* (Junge) Smirnov and *S. pulcherrima* C. Koch occur occasionally in the Alps of Italy. The latter two are absent from France and Switzerland. Descriptions and a key to the identification of species are provided.—[D.H.K.]

TOPOGRAPHICAL

0, Sarnia: Guernsey. Jee, N., 1967, Botanical Report, *Rep. Trans. Soc. Guernés.*, **18**, 24. Reports the discovery of *Trifolium occidentale* above Pleinmont Point—a second Guernsey station, and records the rediscovery of *Ophrys apifera* on the island.—[D.H.K.]

1-2, Cornwall & 1b, Isles of Scilly. Paton, J. A., 1968, *Wild Flowers in Cornwall and the Isles of Scilly*. Pp. 122 + 8 plates, D. Bradford Barton, Truro. Price 25/-. A popular account of the flowering plants to be seen in Cornwall and the Isles of Scilly. The chapters are arranged under habitats which are subdivided into the months when the various species are in flower.—[D.H.K.]

3, S. Devon. Lawrence, G. M., 1968, Some botanical notes on Warleigh Point Wood, *J. Devon. Trust Nat. Conserv.*, **1**, 583-586.

5-6, Somerset. Hallam, A. D., 1967, Botany: Recorder's notes: vascular plants, *Proc. Somerset archaeol. nat. Hist. Soc.*, **111**, 78.

6, N. Somerset. Bridgewater, P., 1968, The vegetation of Steep Holm Island, *J. Durham Univ. Biol. Soc.*, **14**. [Pp. 5]. The history of the flora of Steep Holm, an island in the Bristol Channel, is reviewed, and the plant communities occurring there are described.—[D.H.K.]

9, Dorset. Good, R. d'O., 1968, Dorset Natural History Society Reports, 1967: Botany, *Proc. Dorset nat. Hist. archaeol. Soc.*, **89**, 46.

10, Isle of Wight. White, T., 1967, Flower Report, *Proc. Isle Wight nat. Hist. archaeol. Soc.*, **6**, 35-38. The more interesting records of plants found in 1966 are listed.—[D.H.K.]

13-14, Sussex & 15, E. Kent. Delvosalle, L., 1968, Observations botaniques faites à la Touissaint 1966 dans le Kent et le Sussex, *Naturalistes belg.*, **49**, 161-165. Notes on the flora made on a visit to Kent and Sussex in 1966, with comments on some of the differences between the flora of south-east England and adjacent areas in France and Belgium.—[D.H.K.]

14, E. SUSSEX. Brightmore, D., 1968, Notes on the local fauna and flora, 1967: Plants, *Hastings E. Suss. Nat.*, **10,** 162-164.

16, W. KENT. Austin, M. P., 1968, Pattern in a Zerna erecta dominated community, *J. Ecol.*, **56,** 197-218. Ecological studies on chalk grassland on the North Downs north-east of Sevenoaks.—[D.H.K.]

16, W. KENT, 17, SURREY, 18, S. ESSEX, 20, HERTS, 21, MIDDLESEX & 24, BUCKS. Lousley, J. E., 1968, Botanical records for 1967, *Lond. Nat.*, **47,** 7-10.

17, SURREY. Beven, G., 1968, Twenty-five years of the Bookham Common Survey, including a note on the increase of scrub on grassland, *Lond. Nat.*, **47,** 95-102. The work of members of the London Natural History Society on the survey of Bookham Common over the last twenty-five years is reviewed. A complete list of the papers published during the course of the survey is appended.—[D.H.K.]

18-19, ESSEX. Jermyn, S. T., 1966, The Umbelliferae in Essex, *Nat. N. Essex*, **1964** and **1965,** 6-11.

18-19, ESSEX. Jermyn, S. T., 1967, The Primroses in Essex, *Nat. N. Essex*, **1966,** 9-13.

20, HERTS. Sage, B. L. (Editor), 1966, *Northaw Great Wood.* Pp. 186 + 4 photographs + 4 maps + 22 plates. Education Committee of the Hertfordshire County Council. Price 21/-. An account of the natural history of Northaw Great Wood, including chapters on trees, shrubs and other flowering plants.—[D.H.K.]

21, MIDDLESEX. Stott, P. A., 1968, The nature and conservation of west Middlesex chalk grassland, *Lond. Nat.*, **47,** 11-19. Phytosociological studies on the chalk grassland of the Harefield district with an appeal for its conservation.—[D.H.K.]

22, BERKS. Bowen, H. J. M., 1968, *The Flora of Berkshire*. Pp. 389. Holywell Press, Oxford. Price 45/-.

23, OXON. & 24, BUCKS. Roden, D., 1968, Woodland and its management in the medieval Chilterns, *Forestry*, **41,** 59-71.

30, BEDFORD. Goldstraw, W. G., 1968, Folly Wood, *Bedfordshire Nat.*, **20-22,** 49-50. A short account of some of the floristic changes which have taken place in Folly Wood situated in the north of Flitwick Moor, the largest boggy area in Bedfordshire.—[D.H.K.]

31, HUNTINGDON. Wells, T. C. E., 1968, Botanical notes, *Rep. Huntingdon. Fauna Flora Soc.*, **20,** 2-5.

33, E. GLOS. Barling, D. M., 1968, The oolitic limestone grasslands of the Cotswolds, *Rep. Glos. Trust Nat. Conserv.*, **6,** 9-15. An account of the flora of the oolitic limestone grasslands of the Cotswolds with proposals for its conservation. —[D.H.K.]

33-34, GLOS. Dudley-Smith, Mrs D. S. & Holland, Mrs S. C., 1968, Botanical notes and records, *N. Glouc. Nat. Soc.*, **19,** 316-318.

34, W. GLOS. Holland, S. C., 1968, A remarkable Gloucestershire site in the Forest of Dean for the tropical fern Pteris vittata L., *N. Glouc. Nat. Soc.*, **19,** 318-321.

37, WORCS. Kiernan, J. A., 1968, Notes on the flora of Worcestershire, 2. Further additions since 1909, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 83-88. Further 'new' records are given for Worcestershire, based on personal observation, records from friends and correspondents and information supplied by the Biological Records Centre, Monks Wood.—[D.H.K.]

38, WARWICK. Packham, J. R., 1968, The influence of Coleophora on seed production in Juncus inflexus, *Proc. Bgham nat. Hist. phil. Soc.*, **21,** 109-116.

39, STAFFS. Edees, E. S., 1967, The wild orchids of Staffordshire, *N. Staffs. J. Field Studies*, **7,** 4-26. An extensive review of the history and present distribution of the species of the Orchidaceae which have occurred, and those which are still found, in Staffordshire.—[D.H.K.]

39, Staffs. Edees, E. S., 1967, Reports of the Sections for 1966: Botany, *N. Staffs. J. Field Studies*, **7**, 97-98. Gives details of the more interesting Staffordshire plants noted in 1966.—[D.H.K.]

49, Caern. Bunce, R. H., 1968, An ecological study of Ysgolion Duon, a mountain cliff in Snowdonia, *J. Ecol.*, **56**, 59-75.

52, Anglesey. Griffin, M. J., Price, G., Smith, V. C. & Spence, T. F., 1968, Puffin Island, 1962-66, *Proc. Bgham nat. Hist. phil. Soc.*, **21**, 117-135. An account of observations made on the geology and natural history of Puffin Island, off the coast of Anglesey, between 1962 and 1966, including a list of 69 vascular plants noted on the island. *Smyrnium olusatrum*, *Conium maculatum* and *Hyoscyamus niger* are believed to have been introduced by the monks of the Brotherhood of Saint Seriol. It is suggested that they could also be responsible for the introduction of various other species, e.g. *Teucrium scorodonia*, once used to make beer bitter, *Glechoma hederacea* formerly the source of a herbal tea, *Dipsacus fullonum*, for carding clothing and *Arctium minus*, the young shoots of which were eaten like asparagus.—[D.H.K.]

57, Derby. Spray, M., 1968, The natural history of Little Matlock Wood, 1. Introduction and disposition of the vegetation, *Sorby Record*, **2** (4), 71-88.

57, Derby. Ward, A. B., 1968, Notes on flowering periods of plants in Gorse Bank Lane, Baslow, 1966, *Sorby Record*, **2** (4), 51-58. Phenological notes on a number of common plant species near Sheffield.—[D.H.K.]

57, Derby & 63, S.-W. York. Spalding, D. A. E., 1967-68, The principal localities studied by naturalists in the Sheffield area, part 1 (A-C), *Sorby Record*, **2** (3), 61-71. Part 2 (D-H), *loc. cit.*, **2** (4), 59-68.

Details are given of the localities of importance in the Sheffield area which have been studied by naturalists. These are classified under a wide range of subjects, e.g. Botany, Bryophytes, Lichens, etc.—[D.H.K.]

57, Derby & 63, S.-W. York. Spray, M., 1967, Notes on the vegetation of the millponds of the Lower Rivelin Valley, *Sorby Record*, **2** (3), 15-52.

58, Chester. Green, B. H. & Pearson, M. C., 1968, The ecology of Wybunbury Moss, Cheshire, 1. The present vegetation and some physical, chemical and historical factors controlling its nature and distribution, *J. Ecol.*, **56**, 245-267.

59, S. Lancs. Hardy, E., 1966, Plant invaders of the City, *Liverpool Daily Post*, 3 Oct. 1966. Notes on the various species noted colonising the Roman Catholic Cathedral building site in Liverpool.—[D.H.K.]

63, S.-W. York. Acton, M., 1968, Coombs Dale, *Sorby Record* **2** (4), 17-22, An account of the flora of Coombs Dale near Sheffield.—[D.H.K.]

63, S.-W. York. Spray, M., 1968, Observations on the flora of a scrapyard at Hillsborough, Sheffield, *Sorby Record* **2** (4), 69-70. An account of the flora of a carbreaker's yard. The soil was heavily compacted and soaked with oil and petrol. Among the 17 species noted were *Equisetum arvense*, *Acer pseudoplatanus*, *Epilobium montanum*, *E. angustifolium*, *Senecio vulgaris* and *S. squalidus*. All the species were small or stunted, and some were sterile.—[D.H.K.]

66, Durham. Shimwell, D. W., 1968, Conspectus Florae Dunelmensis, *J. Durham Univ. Biol. Soc.*, **14**, [pp. 4]. The history of botanical recording in Durham is reviewed and proposals are put forward for a new check-list and Flora of the county. An example of the format of the suggested work is given with *Bromus erectus* as the sample species.—[D.H.K.]

66, Durham, 67-68, Northumberland, 80, Roxburgh & 81, Berwick. Swan, G. A. & Swan, M., 1968, Records: Flowering plants and ferns, *Vasculum*, **53**, [8] & 15-16.

68, CHEVIOTLAND. Hird, L. P., 1968, Plants on Holy Island, *Vasculum*, **53**, 13. Notes on various species noted during a visit to Holy Island. Species which may be new to the flora are *Pyrola rotundifolia*, *Apium graveolens*, *Euphorbia peplus* and *Lotus tenuis*.—[D.H.K.]

71, ISLE OF MAN. Garrad, L. S., 1968, Plants of the Manx National Trust Properties, *J. Manx Mus.*, **7**, 67-68. Notes on local and rare plants found in the Manx National Trust Properties, viz. The Calf of Man, Eary Cushlin, Marine Drive, Maughold Head to Gob ny Rona, Silverdale, and Spanish Head.—[D.H.K.]

SCOTLAND. Kayll, A. J., 1967, Moor burning in Scotland, *Proc. Annual Tall Timbers Fire Ecology Conference* (*Tallahassee*, *Florida*), **6**, 29-39.

SCOTLAND. Pears, N. V., 1968, The natural altitudinal limit of forest in the Scottish Grampians, *Oikos*, **19**, 71-80. The present upper forest margins of the north-east Scottish Grampians are not at their natural level. Evidence for the natural altitudinal limit of the Caledonian forest in this region today is examined. The available temperature data indicates a tree line approaching 760 metres. The results of simple experiments to measure relative wind exposure in the Cairngorm Mountains are presented. Wind is shown to be an important factor and to modify significantly the level determined by temperature alone. Data on the distribution of high-level tree seedlings, subalpine scrub and Gaelic place-names also suggests a lower level. On exposed slopes the potential tree line is unlikely to exceed 610 m. It would probably extend to 685 m. in sheltered localities. A map of the natural limits is included.—[Author's summary]

95, MORAY. Webster, M. McCallum, 1968, *A Check List of the Flora of the Culbin State Forest*. Pp. [vi] + 31 + index + 1 map. Elgin. Price 5/6. A check list of the plants of the Culbin State Forest, with vascular plants by M. McCallum Webster, bryophytes by R. Richter, lichens by H. Wilson, and drawings by H. G. Peterkin. Localities are provided except in the case of generally distributed species.—[E.B.B.]

103, MID EBUDES. Turner, N. & Finlay, A., [no date], *The Isle of Mull*. A Short Guide to the Island including information on the Flora of Mull and Place Names: The Flora of Mull, pp. 25-28. Price 4/-. The account of the 'Flora of Mull' is subtitled 'The following is a list of some lesser known plants and flowers recently found on Mull'. By 'recently found' the authors must mean in most cases 'recently noted' as some of the species have been known on Mull for a long time. It includes only vascular plants, and no localities are given. Common names of plants are also cited.—[E.B.B.]

108, W. SUTHERLAND. Boatman, D. J. & Armstrong, W., 1968, A bog type in north-west Sutherland, *J. Ecol.*, **56**, 129-141.

IRELAND. Clark, S. C., 1968, The structure of some Ulex gallii heaths in Eastern Ireland, *Proc. R. Ir. Acad.*, **66B**, 43-51.

H.16, W. GALWAY. Boyle, P. J., 1968, Preliminary account of Spartina pectinata Link new to Ireland, *Ir. Nat. J.*, **16**, 74-75.

H.21, DUBLIN. Doogue, D., 1968, Plant records from Co. Dublin, *Ir. Nat. J.*, **16**, 79.

H.27, W. MAYO. Walsh, F. E. R., 1968, An interesting form of Vicia sepium L. on Duvillaum More Island, Co. Mayo, *Ir. Nat. J.*, **16**, 77-78.

H.27, W. MAYO. White, R. M., 1968, The vegetation of the Curraun Peninsula, Co. Mayo, *Ir. Nat. J.*, **16**, 57-62. The Curraun peninsula is an area of 50 square miles on the west coast of Mayo, joined to the mainland at Mulranny and to Achill Island by a short bridge. It has three peaks of above 1500 ft. between which lies a valley of blanket-bog, with a series of lakes at the west end, these are blocked by morainic materials. Streams running off the slopes of the peaks form the

Curraun River which flows into Bellacragher Bay at the east end of the valley. The geology of the area is outlined, and the sixteen plant communities present are described.—[D.H.K.]

FLORAS, CATALOGUES, ETC.

EUROPE

ENGLAND. Bowen, H. J. M., 1968, *The Flora of Berkshire*. Pp. 389. Holywell Press Oxford. Price 45/-.

FRANCE. Polunin, O. & Huxley, A., 1967, *Fleurs du Bassin méditerranéen, Traduction—adaption de G. G. Aymonin*. Pp. 325 + 8 photographs in black and white + 24 coloured plates + 7 maps. Fernand Nathan, Paris. A French translation of *Flowers of the Mediterranean* (1965), with text enlarged to cover the flora of the French Mediterranean region, Corsica and North Africa.—[D.H.K.]

GERMANY. Schmeil-Fitschen: *Flora von Deutschland und seinen angrenzenden Gebieten. Ein Buch zum Bestimmin der Wildwachsenden und häufig kultivierten Pflanzen*. 81st edition by Rauh, W. & Senghas, K., 1968. Pp. 516. Quelle & Meyer, Heidelberg. Price DM 16·80. The latest edition of Schmeil-Fitschen's *Flora von Deutschland*, with concise descriptions, keys, and revised nomenclature.—[D.H.K.]

POLAND. Grodzińska, K., 1968, Rósliny narzyniowe Pasma Bukowicy (Beskid Niski), *Fragm. Flor. geobot.*, **14**, 3-82. A systematic account of the 589 species of vascular plants known in the Bukowica Range, Polish West Carpathians. Details of frequency, habitat, localities, altitudinal range, etc. are provided.—[D.H.K.]

Madalski, J. (Editor), 1967, *Atlas Flory Polskiej i ziem osciennych*. 6 (59) *Polygonaceae* (*pars* 2)—*Platanaceae*, by A. Sadowsku. Pp. 51 + 31 plates. Polsku Akademia Nauk Instytut Botaniki. Warszawa. A further part of the Atlas of Polish plant species, containing text and distribution maps covering genera from *Polygonum* to *Platanus*.

9 (6) *Cruciferae* (*pars* 5), by E. Skwizyńska. Pp. 67 + 29 plates. Genera covered in this part are *Erysimum*, *Cheiranthus* and *Alyssum*.—[D.H.K.]

SWEDEN. Suneson, S., 1968, Vegetation och flora i Skaftö socken i mellersta Bohuslän, *Svensk bot. Tidskr.*, **62**, 1-120. An account of the vegetation and flora of the parish of Skaftö in central Bohuslän, on the west coast of Sweden.—[D.H.K.]

AFRICA

NORTH AFRICA. See FRANCE.

ASIA

IRAQ. Townsend, C. C., Guest, E. & Al-Rawi, A. (Editors), 1968, *Flora of Iraq*. Vol. 9. *Gramineae*, by N. L. Bor, with economic and distributional notes, etc., by Evan Guest. Pp. vi + 388. Ministry of Agriculture of the Republic of Iraq, Baghdad. The latest volume of the flora of Iraq contains descriptions, synonymy and keys to the identification of the species of the Gramineae found in the country. Many of these occur as adventives in Britain.—[D.H.K.]

NORTH AMERICA

CANADA. Calder, J. A. & Taylor, R. L., 1968, *Flora of the Queen Charlotte Islands, Part I. Systematics of the Vascular Plants*. Research Br. Canada Department Agr. Monograph No. 4 part 1. Pp. xiii + 659. Toronto, Montreal, etc. The Queen

Charlotte Islands consist of a group of *c.* 150 islands arranged in a triangular shaped archipelago off the north-west coast of British Columbia. The geology, climate, forestry and agriculture of the islands are described, and chapters are provided on cultivated trees and shrubs, plant communities and phytogeography. The number of vascular plant species and subspecies known is 593, representing 69 families and 277 genera. Detailed descriptions of the species, many of which occur also in Britain, are given, together with synonymy, keys to their identification, and distributional data which are illustrated by dot maps. A useful glossary and an exhaustive bibliography complete this excellent work.—[D.H.K.]: *Loc. cit., Part* 2. *Cytological aspects of the vascular plants.* Pp. ix + 148.

Porsild, A. E. & Cody, W. J., 1968, *Checklist of the Vascular Plants of Continental Northwest Territories, Canada.* Pp. 102 + 1 map. Plant Research Institute, Canada Department of Agriculture. Ottawa, Ontario.

UNITED STATES. Boughey, A. S., 1968, *A Checklist of Orange County Flowering Plants.* Mus. of System. Biol. Univ. California, Irvine Research Series No. 1. Pp. iii + 89 + 1 map.

ECOLOGICAL (see also TOPOGRAPHICAL)

BANNISTER, P., 1968, An evaluation of some procedures used in simple ordinations, *J. Ecol.*, **56,** 27-34.

BOARDMAN, W. S., 1967, Wildfire and natural area preservation, *Proc. Annual Tall Timbers Fire Ecology Conference* (*Tallahassee, Florida*), **6,** 135-142.

BROUWER, R., 1968, Symposium on 'The mechanism of ecological adaption' held October 28, 1967: Morphological and physiological adaptions to external condition, *Acta bot. neerl.*, **17,** 78-80.

COHEN, D., 1968, A general model of optimal reproduction in a randomly varying environment, *J. Ecol.*, **56,** 219-228.

FROMENT, A., 1968, La colonisation végétale des boues alcalines résiduelles d'une usine de pâte à papier (Mont-Saint-Guibert), *Bull. Soc. r. Bot. Belg.*, **101,** 39-51. The tip of the pulp factory of Mont-Saint-Guibert is made up of the accumulation of calcium carbonate ($CaCo_3$) produced at the end of the cycle of pulp fabrication when the caustic soda (NaOH) which serves to cook the wood is regenerated.

The fresh mud has a pH higher than 12 because of the presence of slaked lime ($Ca(OH)_2$) and caustic soda (NaOH).

The analyses show that with time a chemical evolution is produced with the mud which progressively carbonizes and bi-carbonizes downwards from the surface.

The plant colonization of the spreading mud is related to this chemical evolution. It begins with the chlorophytes, followed by the mosses, and after three or four years by a species generally considered as halophilous, *Puccinellia distans.* The dispersion and the ecology of this plant is discussed. The last stage of the colonization is marked by the arrival of a series of ubiquitous species and finishes by the forestation of the tip.—[Author's summary]

HAVAS, P. J., 1967, Zur Ökologie der Laubwälder, insbesondere der Grauerlenwälder, und der Küste der Bottenwick, *Aquilo, ser. Bot.*, **6,** 314-340.

HUDSON, P. J., 1968, The plant and its environment, *Jl. R. hort. Soc.*, **93,** 193-209 and 243-254. A discourse on the effects of weather on plants and vice versa, being the Masters Memorial Lecture presented in 1967.—[D.H.K.]

KLEIN, J., 1967, Powiazonie miedzy pokrywa sniezna azbiorowiskami róslinnymi w Ojcowskin Parku Narodowym, *Fragm. Flor. geobot.*, **13,** 77-100. Studies on correlations between snow cover and plant communities in the Ojców National Park, Poland.—[D.H.K.]

Komarek, E. V., Sr., 1967, Fire—and the ecology of man, *Proc. Annual Tall Timbers Fire Ecology Conference* (*Tallahassee, Florida*), **6**, 143-170. A review of the effects of fire on plant life and regeneration. An extensive bibliography is appended. —[D.H.K.]

Loach, K., 1968, Relations between soil-nutrients and vegetation in wet heaths, 2. Nutrient uptake in the field and in controlled conditions, *J. Ecol.*, **56**, 117-127. Studies on seedlings of *Molinia caerulea*, *Calluna vulgaris* and *Erica tetralix* grown experimentally in three sites representative of the different facies of wet heath.—[D.H.K.]

Mead, R., 1968, Measurement of competition between individual plants in a population, *J. Ecol.*, **56**, 35-45.

Palmblad, I. G., 1968, Competition in experimental populations of weeds with emphasis on the regulation of population size, *Ecology*, **49**, 26-34. Species included in this experimental study are *Bromus inermis*, *B. tectorum*, *Capsella bursa-pastoris*, *Conyza canadensis*, *Plantago lanceolata*, *Senecio sylvaticus*, *S. viscosus* and *Silene anglica*.—[D.H.K.]

Sankey, J., 1966, *Chalkland Ecology*. Pp. 137. Heinemann, London. Contains much data on plant ecology.—[D.H.K.]

Suominen, J., 1968, Changes in the aquatic macroflora of the polluted Lake Rautavesi, S.W. Finland, *Annls. Bot. Fenn.*, **5**, 65-81. Between 1954 and 1967 the Finnish river Kokemäenjoki became rather heavily polluted by different industrial effluents, town sewage and agricultural waste. Aquatic species of a section of the area which had been mapped in 1954 were again mapped in 1967. It was found that during the intervening period six species had invaded the area—*Ceratophyllum demersum*, *Elodea canadensis*, *Myriophyllum verticillatum*, *Potamogeton zosterifolius* Schum., *Hydrocharis morsus-ranae* and *Spirodela polyrhiza* (L.) Schleid. (*Lemna polyrhiza* L.). Species which were present in 1954 but had increased during the period were *Lemna minor*, *Utricularia vulgaris*, *Potamogeton obtusifolius*, *Butomus umbellatus*, *Typha latifolia* and *Glyceria maxima*. There were no really obvious cases of decrease to any great extent in species present in 1954, though *Myriophyllum alterniflorum*, *Ranunculus peltatus* and *R. lingua* showed a slight decrease.

The immigrant species appeared to have a number of common characters—vegetative dispersal, eutrophy, and a somewhat southern range.—[D.H.K.]

Tachibana, H., 1968, Weed invasion upon the mountain areas in Mt. Hakkôdo, *Ecological Review* (*Japan*), **17**, 95-101. Observations on the recent influx of weedy species into the mountain areas of Mount Hakkôdo, south of Aomori City, Japan. The areas invaded included open ground cleared by lumbering and other human activities, ground where rubbish had been dumped, etc. Species adventive in Japan which have become established in the area include *Poa annua*, *P. pratensis*, *Trifolium repens*, *Rumex obtusifolius*, *R. acetosella*, *Stellaria media*, *Erigeron annuus*, *Oenothera erythrosepala*, *Cerastium glomeratum* and *Taraxacum officinale*. Native weeds include *Equisetum arvense* and *Chenopodium album*.—[D.H.K.]

Tansley, A. G., 1968, *Britain's Green Mantle*. Second edition, revised by M. C. F. Proctor. Pp. 327. George Allen and Unwin. London. Price 50/-.

Tikhomirov, B. A., 1967, Environment and the mode of plant adaption to it in the far north of the U.S.S.R., *Aquila, ser. Bot.*, **6**, 104-112.

Tyler, G., 1968, Studies on the ecology of Baltic sea-shore meadows, 1. Some chemical properties of Baltic shore-meadow clays, *Bot. Notiser*, **129**, 89-111.

Walker, B. H. & Coupland, R. T., 1968, An analysis of vegetation—environment relationships in Saskatchewan sloughs, *Can. J. Bot.*, **46**, 509-522. A study on the distribution of species in 64 sloughs (i.e. depressional areas occupied by herbs and shrubs, that contain standing water for at least a few weeks in the spring) in Saskatchewan.—[D.H.K.]

Westhoff, V., 1967, De invloed van het wild op vegetatie, *Ned. BoschbTijdschr.*, **39,** 218-232. Observations on the effects of game stock in woods and forests, with examples from localities in Europe, America and New Zealand.—[D.H.K.]

PHYTOSOCIOLOGICAL, PHYTOGEOGRAPHICAL AND FLORISTIC STUDIES

Aichinger, E., 1967, Verwendung der finnländischen Waldtypen in den Alpen, *Aquila, ser. Bot.*, **6,** 94-103.

Bamberg, S. A., 1968, New records of disjunct Arctic-Alpine plants in Montana, *Rhodora*, **70,** 103-112. *Festuca vivipara* from Glacier National Park and Siyeh Pass, Montana are considerably removed from the range shown by Hultén (1958). *Juncus biglumis* is also reported from two localities in Montana. —[D.H.K.]

Baudiere, A. & Kupfer, P., 1968, Sur les peuplements d'astragales épineux de la partie orientale de la chaine pyrénéenne, *Bull. Soc. Neuchâtel. Sci. Nat.*, **91,** 75-85. The authors have studied stands of *Astragalus sempervirens* Lamk. *s.l.* in the Eastern Pyrenees and describe a facies of the *Festucetum scopariae* Br.-Bl., i.e. the sub-association *Astragaletosum*. The ecological factors suitable for this group are: southern exposure, limestone bedrock, steep slope preventing the formation of differentiated soil horizons.

The sub-association *Astragaletosum* may be considered a vicariant of a Nevadian association similar to the *Siderieto-Arenarietum pungentis* Quézel.—[Authors' summary]

Berglund, B. E., 1968, Inventerung av Blekinges flora 1958-1968—resultat och metodik, *Bot. Notiser*, **121,** 287-292. An account of the first ten years of an investigation by the Lund Botanical Society of the distribution of vascular plants and plant communities in the province of Blekinge, south west Sweden. The units used in the investigation are parishes which are divided into sections with an area of 2 to 3 square kilometres.—[D.H.K.]

Braun-Blanquet, J., 1968, Zum Vordringen der Neophyten-vegetation in der Südschweiz (Val-Mesocco), *Coll. Bot.*, **7,** 101-115.

Brilli-Cattarini, A. J. B., 1968, Su alcune piante ibride raccolte nella regione Marchigiano, *G. bot. ital.*, **102,** 121-137. Notes on a number of hybrids found in the Marche region of Italy, including *Polygonum* × *condensatum* F. Schultz (*P. mite* × *persicaria*).—[D.H.K.]

Chirca, E. & Coldea, G., 1968, Contributii la cunoasterea vegetatiei Bazinului Superior al văii căpuşului, *Index Seminum Note Botanice—Notulae Bot.* (*Cluj*), **1967,** 101-110.

Christopherson, E., 1968, Flowering plants from Tristan da Cunha, *Results of the Norwegian Scientific Expedition to Tristan da Cunha, 1937-1938*, No. **55,** 1-29. Notes on a number of plants seen on Tristan da Cunha in 1937-38. Introductions new to the island included *Juncus bufonius*, *J. tenuis*, *Stellaria media*, *Myosotis ramosissima* and *Prunella vulgaris*. *Plantago lanceolata* was very polymorphic, and *Bellis perennis* appeared to be spreading, though of fairly recent introduction. —[D.H.K.]

Corti, E. F., 1967, Problemi di fitogeografia della Puglia, *Archivio Botanica*, **43,** 194-226.

Czerwinski, A., 1967, Niektóre rzadsze rósliny naczyniowe Województwa bialostockiego, Czesc, 1, *Fragm. Flor. geobot.*, **13**, 329-335. The commencement of an annotated list of some of the less common vascular plants of Bialystok, north-east Poland.—[D.H.K.]

Denaeyer-De-Smet, S., 1968, Recherches sur l'écosystème forêt, Série B: La chênaie mélangée calcicole de Virelles-Blaimont, Contribution no. 6, Quelques données sur les teneurs en K et Ca des sèves xylémiques des racines, troncs et branches des essences forestières en fin de repos hivernal, *Bull. Soc. r. Bot. Belg.*, **101,** 155-176.

Dethioux, M., 1967, Les types de végétation de la Lorraine belge, *Pays Gaumais*, **27/28,** 103-136.

Domac, R., 1968, Die Zuteilung der Arten zu den Vegetationsgürteln innerhalb der Flora Jugoslawiens, *Vjschr. naturf. Ges. Zürich*, **113,** 119-155. The phytosociological elements found in Yugoslavia are described and the species comprising them are grouped under their respective elements.—[D.H.K.]

Duvigneaud, P., 1968, Recherches sur l'écosystème forêt, Série D: La chênaie frênaie à coudrier du bois de Wève (Wavreille et Bure), Contribution no. 2, Aperçu sur la biomasse, la productivité et le cycle des éléments biogènes, *Bull. Soc. r. Bot. Belg.*, **101,** 111-127.

Duvigneaud, P., 1968, Recherches sur l'écosystème forêt, Série D: La chênaie mélangée calcicole de Virelles-Blaimont, Contribution no. 13, Bisect biogéochimique et composition des nappes foliaires en polyéléments biogènes, *Bull. Soc. r. Bot. Belg.*, **101,** 129-139.

Duvigneaud, P. & Denaeyer-De-Smet, S., 1968, Essai de classification chimiques (éléments minéraux) de plantes gypsicoles du bassin de l'Ebre, *Bull. Soc. r. Bot. Belg.*, **101,** 279-291.

Einarsson, E., 1967, The colonisation of Surtsey, the new volcanic island, by vascular plants, *Aquilo*, *ser. Bot.*, **6,** 172-182. The island of Surtsey off the Icelandic coast was formed from volcanic material in an eruption from 14 Nov. 1963 to 5 June 1967. Seeds and fragments of 27 vascular plants have drifted ashore and have been identified. *Cakile edentula* (Bigel) Hook. was found growing in the northeast of the island in 1965, and again in 1966 with *Elymus arenarius*, but both species survived for only a few weeks.

In 1967 both species were again found, together with *Honkenya peploides*, *Mertensia maritima* and *Festuca rubra*, together with two species of the bryophyta —*Funaria hygrometrica* Hedw. and *Bryum argenteum*. Four of the vascular plant species have without doubt been carried to Surtsey by sea currents from the Vestmann Islands, and the fifth, *Festuca rubra*, either by sea currents or birds. The two mosses have probably been accidentally introduced by man.—(D.H.K.]

Einarsson, E., 1968, Ný jar plöntutegundir nema land í Surtsey, *Náttúrufraedingurinn*, **37,** 105-111. Further notes are provided on the colonisation of Surtsey by plant species.—[D.H.K.]

Ernst, W., 1968, Zur Kenntnis der Soziologie und Ökologie der Schwermetallvegetation Grossbritanniens, *Ber. dt. bot. Ges.*, **81,** 116-124. Ecological and phytosociological studies on soils contaminated by zinc, lead and copper in Great Britain have shown that such contaminated areas are characterised by the presence of *Minuartia verna* and *Thlaspi alpestre*. These can be incorporated into the separate class of European mine communities, the *Violetea calaminariae*.

A high zinc content has been found in cell sap in both *Thlaspi arvense* and *Minuartia verna*.—[D.H.K.]

Fabijanowski, J. & Zarzycki, K., 1967, Wody gruntowe w Zbiorowiskach lesńych nadlesnictcwa blizyn (Góry Swietokrzyskie), *Acta Agraria et Silvestria, series*

Silvestris, 7, 3-41. Studies on the oscillations of the ground water table in forest communities at Blizyn, Swietokrzyskie Mountains, Central Poland.—[D.H.K.]

FAVARGER, C. & KUPFER, P., 1968, Contribution à la cytotaxinomie de la flore alpine des Pyrénées, *Coll. Bot.*, **7**, 325-357. Cytotaxonomic studies on a number of species found in the Pyrenees, including *Koeleria vallesiana*, *Luzula spicata*, *Cerastium arvense*, *Astragalus alpinus*, *Oxytropis campestris*, *Astrantia major* and *Gentiana nivalis*.—[D.H.K.]

FRANCO, J. do AMARAL & ALFONSO, M. L. del ROCHA, 1968, Distribuiçao de zimbros e pomóideas na península Ibérica, *Coll. Bot.*, **7**, 449-481. Notes on the distribution, illustrated by maps, of a number of taxa in the Iberian peninsula, including *Juniperus communis* and various subspecies, *Crataegus monogyna* and various subspecies, *Malus sylvestris*, **Pyrus pyraster** Burgsd. (*P. communis auct.*), *P. bourgaeana* Decne, *P. amygdaliformis* Vill. (*P. communis* var. *pyraster* auct., non L., *P. achras* auct.).—[D.H.K.]

GIACOMINI, V., 1967, Le paysage végétal de la Sardaigne septentrionale, *Vegetatio*, **15**, 213-222. In this account of the vegetation of northern Sardinia, climate, soils and drainage are first dealt with, then the various natural areas are described. —[E.B.B.]

GODAY, S. R., 1968, Algunas novedades fitosociológicas de España meridional, *Coll. Bot.*, **7**, 997-1031.

GRIBBON, P. W. F., 1968, Altitudinal zonation in East Greenland, *Bot. tidsskr.*, **63**, 342-357. Studies on altitudinal zonation of vascular plant species in the Caledonian alps of East Greenland, based on data obtained from 98 species collected from 17 localities between sea-level and 1,570 metres altitude.—[D.H.K.]

GRULOIS, J., 1968, Recherches sur l'écosystème forêt, Série B: La chênaie mélangée calcicole de Virelles-Blaimont, Contribution no. 14, La variation annuelle du coefficient d'albédo des surfaces supérieures du peuplement (Annual variation of short-wave reflexion coefficient for an oak forest), *Bull. Soc. r. Bot. Belg.*, **101**, 141-153.

HADAC, E. & RESMANEK, M., 1968, Příspévek k fytogeografi české časti Javořích hor v Sudetském mezihoří, *Preslia*, **40**, 306-318. Phytosociological studies on the Bohemian area of the Javoří hory mountains in the Sudety range.—[D.H.K.]

HOUNSELL, R. W. & SMITH, E. C., 1968, Contributions to the flora of Nova Scotia, 9. Habitat studies of Arctic-Alpine and boreal disjunct species, *Rhodora*, **70**, 176-192. The peculiar combinations of shade, moisture, temperature, exposure and instability of habitat allow isolated colonies of arctic-alpine and boreal disjuncts, each typically consisting of a number of species, to exist as biotypically reduced remnants far from the present population centres. These same factors militate against most of the species of the surrounding forest so that the isolated populations can compete on at least an equal basis, thereby maintaining their precarious hold. A minor change in the habitat could swing the competitional balance in the direction of the common species with the almost inevitable elimination of these outliers.—[Authors' summary]

HULTEN, E., 1968, Comments on the Flora of Alaska and Yukon, *Arkiv Bot.*, **7** (1), 1-147. The last Flora of Alaska and the Yukon was completed in 1950. A revision of this is to be published under the title of "Flora of Alaska and neighbouring countries". The author reviews recent discoveries, nomenclatural and taxonomic changes which have taken place in the last eighteen years. Many of the genera and species treated occur also in Britain.—[D.H.K.]

HUSOVA, M., 1968, Tannenmischwälder und Schuttwälder im Tal der Mittleren Lužnice und oberen Moldau in Südbohemen, Tschechoslowakei, *Folia Geobot. Taxon.*, **3**, 143-182. A phytosociological study of natural forest communities in southern Bohemia.—[D.H.K.]

Jage, H., 1967, Vorarbeiten zu einer Flora der Dübener Heide und ihrer näheren Umgebung (4. Beitrag), *Wiss. Z. Martin-Luther-Univ. Halle-Witten.*, **16,** *Reihe*, 851-861.

Jula, F., 1968, Contributi la cunoasterea plantuler uner specii dicotiledonate. *Index Seminum Note Botanice—Notulae Bot.* (*Cluj*), **1967,** 93-99. Morphological characters are described of the spontaneous dicotyledonous seedlings (2-6 leaves) of 26 species belonging to the following plant associations:—*Molinio-Arrhenatheretea* Tx. 1937, *Festuca-Brometea* Br.-Bl. & Tx. 1943, *Querco-Fagetea* Br.-Bl. & Vlieg. 1937, *Secalinetea* Br.-Bl. 1951, *Chenopodietea* Oberd. em. Lohm. & R. Tx. 1961 and *Artemisietea vulgaris* Lohm, Prsg. Tx. 1950.—[D.H.K.]

Kauppi, M., 1967, Über den Einfluss der Beweidung auf die Vegetation der Uferwiesen und der Bucht Liminganlahti im Nordteil des Bottnischen Meerbusens, *Aquilo, ser. Bot.*, **61,** 347-369.

Kornas, J. & Medwecka-Kornas, A., 1967-68, Zespoly roslinne Goreów, 1. Naturalne i na wpól naturalne zespoly nielésne, *Fragm. Flor. geobot.*, **13,** 167-316. 2. Zespoly Synantropijne, *Loc. cit.*, **14,** 83-125. Studies on the plant communities of the Gorce Mountains, Polish west Carpathians, arranged under associations found in particular habitats, e.g. rocks, riverside gravel banks, streams, swamps, marshes, meadows, forest clearings, etc.—[D.H.K.]

Kovacs, M., 1968, Die Vegetation im Überschwammungsgebiet des Ipoly (Eipel)—Flusses, 2. Die ökologischen Verhaltnisse der Pflanzengesellschaften, *Acta bot. hung.*, **14,** 77-112.

Kranz, M. & Pein, H. von, 1966, Waldflora von Glücksberg, *Jb. Angler Heimatver*, **1966,** 150-179.

Krol, S., 1967, Lasy legow rezerwatu lesnego Zimna Woda kolo Zielonej Góry, *Fragm. Flor. geobot.*, **13,** 413-417. Notes on the forest reserve of Zimna Woda, Poland, which has been conserved in view of its natural *Alnus-Fraxinus* association. The characteristic plant associations of the reserve are briefly described.—[D.H.K.]

Kunkel, G., 1968, Nuevas plantas para la flora Canaria, *Cuad. Bot.*, **3,** 57-58. Species new to the Canary Islands include *Ophioglossum azoricum*, and the adventives *Azolla filiculoides* and *Lonicera nitida.*—[D.H.K.]

Kupfer, P., 1968, Nouvelles prospections caryologiques dans la flore orophile des Pyrénées et de la Sierra Nevada, *Bull. Soc. Neuchâtel. Sci. Nat.*, **91,** 87-104. A comparative study has been made between alpine plants from the Pyrenees and Sierra Nevada. Chromosome numbers of 46 different taxa from the two areas are reported.—[E.B.B. & D.H.K.]

Lundqvist, J., 1968, Plant cover and environment of steep hillsides in Pite Lappmark, *Acta Phyt. Suec.*, **53,** 1-153 + 29 tables. Pite Lappmark is an extensive area in the middle regions of Swedish Lappland. The flora, vegetation and plant communities of the area are described and reviewed.—[D.H.K.]

Magallon, A. R., 1968, Algunas associaciones de la classe Salicornietea fruticosae Br.-Bl. et Tx. 1943 en la Provincion de Alicante, *Coll. Bot.*, **7,** 975-995.

Makirinta, U., 1968, Haintypenuntersuchungen im mittleren Süd-Häme, Süddfinnland, *Annls. Bot. Fenn.*, **5,** 34-36. A phytosociological account of the south Häme area, southern Finland.—[D.H.K.]

Mayor, M., 1968, Analogías florísticas y fitosociológicas entre las Sierras de Guder y Pela, *Coll. Bot.*, **7,** 767-779.

Meisel, K., 1967, Über die Artenverbindung des Aphanion arvensis J. et R. Tüx. im west- und nordwestdeutschen Flachland, *Schrift. Vegetationsk.*, **2,** 123-133.

Melzer, H., 1966, Floristisches aus Kärnten, *Carinthia II*, **76,** 21-27.

Merce, J., 1967, Contribution à l'étude de la flore de la région du col d'Aubisque (Basses-Pyrénées), *Bull. Soc. Hist. nat. Toulouse*, **103,** 541-566. A general account of the topography, climate, geology, etc. of this region is given followed by lists of the most important plant species by zones. Over 600 species have been recorded from this richly varied area.—[D.H.K.]

Merxmuller, H. & Zollitsch, B., 1967, Über die Sonderstellung der Vegetation auf Kalkschieferschutt, *Aquila, ser. Bot.*, **6,** 228-248.

Molinier, R., 1968, Le dynamisme de la végétation Provençale, *Coll. Bot.*, **7,** 817-844.

Montserrat-Recoder, P., 1968, Los hayedos Navarros, *Coll. Bot.*, **7,** 845-893. Phytosociological studies on *Fagus sylvatica* communities in the Spanish western-Pyrenees.—[D.H.K.]

Neuhausl, R., 1968, Draft proposals for nomenclature principals in floristic phytosociology, *Folia Geobot. Phytotaxon.*, **3** (1), 47-55. In 15 basic articles the author summarises draft nomenclatural principles on phytosociology (the Braun-Blanquet School). The draft is to be considered as an attempt to introduce into plant sociology such rules as respect the object and method of establishing sociological units based on typification. The conception of a unit given by the diagnosis, is considered to be the most important criterion of a correct name.—[Author's summary]

Ooststroom, S. J. van & Mennema, J., 1968, Nieuwe vondsten van zeldzane planten in Nederland, hoofdzakelijk in 1967, *Gorteria*, **4,** 33-42. A list of new localities of rare and interesting species found in the Netherlands mainly during 1967.—[Authors' summary]

Orloci, L., 1968, Definitions of structure in multivariate phytosociological samples, *Vegetatio*, **15,** 281-291.

Oskarsson, I., 1967, Gródurransóknir í Dalasýslu Sunnanverdri sumarid 1949, *Flóra* (*Tímaret*), **5,** 21-51. An account of a study of the vascular plants of Dalasýslu, western Iceland, carried out in the summer of 1949. Details are given of topography, climate and vegetational units. No less than 229 species were recorded, including *Carex pallescens* which was new to Iceland. As the total number of indigenous and naturalised species in the country (excluding *Hieracium* and *Taraxacum*) comprises 440 it appears that 63·9% of all species of vascular plants which occur on the island grow in Dalasýslu. Details of previous studies on the area are provided.—[D.H.K.]

Pazmany, D., 1968, Insemnári floristice, 3, *Index Seminum Note Botanice—Notulae Bot.* (*Cluj*), **1967,** 63-64. A number of new varieties and forms of Romanian plants are described.—[D.H.K.]

Poirion, L. & Barbero, M., 1968, Les espèces en limite d'aire dans les Alpes-Maritimes et Ligures, *Riviera Scient.*, **1968** (2), 18-40.

Rainha, B. V., Pinto Da Silva, A. R., et al., 1968, Plantas noves e novas areas para a flora de Portugal, 9, *Agronomia lusit.*, **29,** 9-12. *Eleusine indica* (L.) Gaertn. is reported as an adventive newly naturalised in Portugal, and distributional notes are given on a number of other Portuguese species, including *Soleirolia soleirolii, Myriophyllum verticillatum, Salpichroa origanifolia* and *Matricaria matricarioides*.—[D.H.K.]

Rintanen, T., 1967, On the distribution of some boreal plants in eastern Lapland, *Aquilo, ser. Bot.*, **6,** 197-208. Distributional notes and dot maps are provided for a number of species in eastern Lapland, including *Angelica archangelica*.—[D.H.K.]

Rivas-Martinez, S., 1968, Los jaralles de a Cordillera Central, *Coll. Bot.*, **7,** 1033-1082.

Rudolph, E. D., 1966, Terrestrial vegetation of Antarctica: past and present studies, *Antarctic. Res. ser.*, **8,** 109-124. A review of ecological and phytosociological research on the plants of Antarctica.—[D.H.K.]

Rybnicek, K. & Rybnickova, E., 1968, The history of flora and vegetation on the Bláto mire in South-eastern Bohemia, Czechoslovakia (Palaeoecological study), *Folia Geobot. Phytotaxon.*, **3,** 117-142.

Siedlecka-Binder, Z., 1967, Roslinnosc wodna w potokach ojecowskiego Porku Narodowego, *Ochr. Przyr.*, **32,** 171-206. Notes on the aquatic and semi-aquatic species found in the d'ojców National Park, 22 km. north-east of Kraków. Many species which occur also in Britain are included in the account.—[D.H.K.]

Skoken, A., 1968, Plantegeografiske undersøkelser på Frøya Sør Trøndelag, 1-2, *Blyttia*, **26,** 48-62. An account of the flora and plant associations of Frøya, the outermost of the large islands at the mouth of the Trondheimsfjord, Norway. Oceanic and sub-oceanic species are well represented, and the following are said to have their northern distribution limit on the island—*Carex binervis*, *Scirpus cespitosus* subsp. *germanicus*, *Hypericum pulchrum* and *Luzula campestris*. —[D.H.K.]

Steindorsson, S., 1967, Notes on the vegetation of road verges at Akureyri, Northern Iceland, *Aquilo, ser. Bot.*, **6,** 183-188. The ruderal plants of Akureyri are tabulated under two headings, (1) species found close to farm buildings, and (2) species found on road verges and open areas in towns; the degree of frequency of each species is also given. For comparison, a third list of species noted on waste ground in towns is provided. Many weedy species which also occur in the British Isles are included in the account.—[D.H.K.]

Steindorsson, S., 1967, Um Hálendisgródur íslands Fjórdí Hiutí, *Flóra* (*Tímaret*), **5,** 53-92. Studies on the vegetation of central Iceland, arranged under associations, e.g. shrub vegetation, vegetation of open soils, tundra moor, etc.—[D.H.K.]

Stuchlikowa, B., 1967, Zepoly lakowe pasma Policy w Karpatach Zachodnich, *Fragm. Flor. geobot.*, **13,** 357-402. A survey of the meadow associations of the Polica range, Polish west Carpathians. Eight plant associations are recognised, these are described and reviewed.—[D.H.K.]

Sunding, P., 1968, Additions to the flora of Gran Canaria, *Cuad. Bot.*, **3,** 3-10. Additions to the flora of the Gran Canaria include *Moricandia arvensis* (L.) DC., new to the Canary Islands, *Juncus inflexus*, *Neotinea intacta*, *Vicia dasycarpa* and *Anthemis arvensis*.—[D.H.K.]

Tarau, V., Savatti, M. & Chiorean, I., 1968, Probleme de allelopatie pe pajisti de Nardus stricta, *Index Seminum Note Botanice—Notulae Bot.* (*Cluj*), **1967,** 111-116.

Tuxen, R., 1967, Pflanzensoziologische Beobachtungen an südwestnorwegischen Küsten-Dunergebieten, *Aquilo, ser. Bot.*, **6,** 241-272. Phytosociological studies on the plant associations of dunes on the coasts of Norway.—[D.H.K.]

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Vigo, J., 1968, Notas sobre la vegetacíon del valle de Ribes, *Coll. Bot.*, **7,** 1171-1185.

Walter, H., 1968, *Die Vegetation der Erde in öko-physiologischen Betrachtung.* Vol. 2. *Die gemässigten und arktischen Zonen.* Pp. 1001. Gustav Fischer Verlag, Jena.

Westfeldt, G. A., 1968, Floran i Vedens Härad (inkl. Borås Stad), *Svensk bot. Tidskr.*, **62,** 121-168. An account of the flora of the district of Veden, including the town of Borås, southern Västergötland, south-western Sweden.—[D.H.K.]

Zollitsch, B., 1968, Soziologische und ökologische Untersuchungen auf Kalkschiefern in hochalpinen Gebieten, *Ber. bayer. bot. Ges.*, **40,** 67-100.

Zurzycka, A., 1967, Badania ekologiczne nad zepolem Festucetum pallentis, *Fragm. Flor. geobot.*, **13**, 403-411.

CHROMOSOME SURVEYS

Gadella, T. W. J. & Kliphuis, E., 1968, Chromosome numbers of flowering plants in the Netherlands, 4, *Proc. K. ned. Akad. Wet., ser. C.*, **71**, 168-183. Chromosome numbers are given for 86 species of Dutch vascular plants.—[D.H.K.]

Love, A. (Compiler), 1968, I.O.P.B. Chromosome number reports, 17, *Taxon*, **17**, 285-288. The following chromosome numbers are reported from Canadian material:—*Dryopteris assimilis*, $n = 41$; *Rumex triangulivalvis*, $n = 10$; *Circaea alpina*, $n = 11$; *Mentha arvensis* var. *villosa* (Benth.) Stewart, $n = 48$; *Plantago major*, $n = 6$; *Alisma gramineum*, $2n = 16$; *Sagina saginoides*, $2n = 22$; *Myosurus minimus*, $2n = 16$; *Ranunculus flammula*, $2n = 32$; *Adoxa moschatellina*, $2n = 36$. 18, *Loc. cit.*, **17**, 419-422. The following chromosome numbers are reported from England:—*Oenanthe aquatica*, *O. crocata*, *O. fistulosa*, *O. fluviatile* and *O. lachenalii*, all $2n = 22$; from Holland, *O. pimpinelloides*, $2n = 22$; from France, *O. silaifolia*, $2n = 22$; from Italy, *Taraxacum officinale*, $2n = 24$; from Yugoslavia, *Arctium nemorosum*, $2n = 36$; from Canada, *Centaurea jacea*, $2n = 22$; *C. pratensis* Thuill., $2n = 44$; *Cirsium arvense* var. *arvense*, $2n = 34$; *C. arvense* var. *vestitum* Wimm. & Grab., $2n = 34$; from Russia, Sweden and Denmark, *Alisma lanceolatum*, $2n = 26$; from Sweden, *A. lanceolatum*, $2n = 28$; from Russia, *A. plantago-aquatica*, $2n = 14$; and from Switzerland, *Crocus albiflorus* Kit., $2n = 8$.—[D.H.K.]

Ornduff, R. (Compiler), 1968, Index to plant chromosome numbers for 1966, *Regnum veg.*, **55**, 1-126.

HISTORICAL

Antonovics, J., 1968, Evolution in closely adjacent plant populations, 5. Evolution of self-fertility, *Heredity*, **23**, 219-238.

Gjaerevoll, O., 1967, Migration and distribution of the mountain plants, *Norske Turistforen. Arb.*, **1967**, 8-13. A review of the possible history of the Scandinavian mountain flora after the last glaciation, together with comments on the present distribution of various montane species.—[D.H.K.]

Hedge, I. C., 1967, The specimens of Paul Dietrich Giseke in the Edinburgh Herbarium, *Notes R. bot. Gdn. Edinb.*, **28**, 73-86. Material in the herbarium of the Royal Botanic Garden, Edinburgh, gathered by the German botanist Paul Dietrich Giseke (1741-91), includes specimens collected from Kew Gardens in 1768 and 1769, from the Oxford Botanic Garden in 1769, and from Uppsala and Hammarby, Sweden in 1771. Details of the specimens are provided, together with data on material collected by some of his contemporaries, including Adolf Murray (1751-1803), Peter Johann Bergius, a pupil of Linnaeus and Professor of Natural History and Pharmacy at Stockholm, John Andreas Murray, Pehr Osbeck (fl. 1750-59), another pupil of Linnaeus, Carl Peter Thunberg and Martin Vahl. —[D.H.K.]

Love, A. & Love, D., 1967, The origin of the North Atlantic flora, *Aquilo*, *ser. Bot.*, **6**, 52-66.

Love, A. & Love, D., 1967, Continental drift and the origin of the Arctic-Alpine flora, *Rev. Roum. Biol., sér. Bot.*, **12**, 163-169. Based on the theory of continental drift, the authors regard the arctic flora as a residuum of the nemoral vegetation that covered the northern parts of Laurasia before the drift northward started during the Tertiary. Contrary to earlier hypotheses, this explanation postulates that arctic species did not disperse northward but rather stayed behind when more tender plants dispersed southward as the continent was forced into less equitable climates. The high frequency of polyploids in the arctic flora is regarded as the result of better adaptability of polyploids than of diploids to changing conditions such as those created by the northward movement of the continent, though this frequency may have been further enhanced by the extreme climates during the Pleistocene. The arctic flora is a tertiary phenomenon and not created by the Pleistocene glaciations as has often been suggested.—[Authors' summary]

Love, A. & Love, D., 1967, Evolution and the Linnean species, *Contrib. Bot.*, 1967, 203-210. One of the outstanding contributions of genetics to the theory of evolution is the discovery that this important process advances by aid of gene mutation, genetic recombination, and natural selection, and that the favourable combinations of the characters produced by this process are conserved in distinct gene pools by aid of reproductive isolation. It was shown by Müntzing (1932) and later confirmed by numerous other cytogeneticists, that the former, genic, process which leads to increased variability of the gene pool, is never correlated with the chromosomal processes which isolate different gene pools from each other, and that extinction of intermediates between gene pools increases their distinction.—[Authors' summary]

Love, A. & Love, D., 1967, Polyploidy and altitude: Mt. Washington, *Biol. Zentralbl.*, **86** (supplement): *Festschrift zum* 65 *Geburtstag von Hans Stubbe*, 307-311. The flora of Mt. Washington, the highest peak in north-eastern America, is the only mountain flora which is completely known cytologically. Of its 175 taxa of vascular plants above the timber line 63·6% are polyploids, or a considerably higher frequency than the about 45% polyploids in the nemoral flora surrounding the mountains. The alpine plants are composed of two historically different elements, i.e. the arctic-alpine plants which are relicts from the Pleistocene glaciations, and the alpine-nemoral plants which have invaded the alpine barrens from the forests below more recently. The arctic-alpine element includes 72% polyploids (100% of the pteridophytes, 96% of the monocotyledons, and 56% of the dicotyledons), whereas the frequency of polyploids within the alpine-nemoral element is 64% (73% of the pteridophytes, 0% of the gymnosperms, 87·5% of the monocotyledons, and 55% of the dicotyledons). It seems safe to conclude that the increase in the frequency of polyploids with altitude and latitude is caused by the increase in the genetical variability that determines the tolerance factors of plants, so that whenever natural selection forces a drastic reduction in the number of species to any particular flora, polyploids are favoured.—[Authors' summary]

McNeilly, T. & Antonovics, J., 1968, Evolution in closely adjacent plant populations, 4. Barriers to gene flow, *Heredity*, **23**, 205-218.

Rousseau, C., 1968, Histoire, habitat et distribution de 220 plantes introduites au Quebec, *Naturaliste can.*, **95**, 49-169. For each of the 220 species studied, the writer tried to find the oldest herbarium sheet or the first quotation in literature proving their occurrence in Quebec. The habitat in which each species is most commonly found is mentioned. To explain their distribution in the Province, he classifies them in twelve groups and presents the following comparisons: The Quebec weeds and those of Alaska and Greenland, date of introduction in relation to present occurrence; distribution of both intentionally and unintentionally introduced species; distribution according to place of origin. An as complete list as possible of the entities introduced in Quebec is also given.—[Author's summary] A number of the species are of Euroasiatic origin and many occur in the British Isles.—[E.B.B.]

Simms, C., 1968, A list of botanical and zoological collections at the Yorkshire Museum, York, *Naturalist*, **1968**, 85-88. Details are given of the herbaria, collectors and contributors of specimens at the historical Yorkshire Museum at York.—[D.H.K.]

Skalicky, V., 1967, Die unvollendete Ikonographie von J. Ch. Mikan Wurde aufgefunden, *Nov. Bot. Hort. Bot. Univ. Prag.*, **1967**, 37-44.

Soo, R., 1968, The history of the vegetation of Hungary, *Coll. Bot.*, **7**, 1109-1120.

Wild, H., 1968, *Weeds and Aliens in Africa. The American Immigrant*. An Inaugural lecture given in the University College of Rhodesia. Pp. 30. Salisbury, Rhodesia. Evidence is produced to show that a high proportion of the weeds in South Central Africa are of Tropical S. American or Central American origin. The origin and history of the various weeds are reviewed and their present distribution in Africa briefly outlined. Species treated include *Xanthium spinosum*, *Galinsoga parviflora*, *G. ciliata*, *Bidens pilosa* and *Sigesbeckia orientalis*.—[D.H.K.]

BIOGRAPHICAL

Bolos, A. de & Bolos, O. de, 1968, Biografía de P. Font Quer, *Coll. Bot.*, **7**, 3-45. A list of the publications of P. Font Quer (1888-1964) arranged in chronological order.—[D.H.K.]

Cater, B., 1968, The happy old parson of Woodbury, *Sunday Times Magazine*, 23 June 1968, 4-11. A short biographical account of the Rev William Keble Martin, based on his autobiography *Over the Hills* . . . —[D.H.K.]

Edwards, G. W., 1968, Peter Collinson, F.R.S., F.A.S., 1694-1768, *Jl. R. hort. Soc.*, **113**, 329-333. A short account of the life of the famous botanist and horticulturist, Peter Collinson.—[D.H.K.]

Martin, W. Keble, 1968, *Over the Hills* . . . Pp. 173. Michael Joseph, London. Price 30/-. The autobiography of the Rev William Keble Martin, author of the 'best seller' *The Concise British Flora in Colour*.—[D.H.K.]

Sands, T. S., 1967, Sir Joseph Paxton—local naturalist, *Sorby Record*, **2** (3), 73-77. Biographical notes on Sir Joseph Paxton (1803-65).—[D.H.K.]

Skalicky, V., 1968, Zivotní jubilea. Dr Jan Otakar Martinovský—65 let, *Preslia*, **40**, 326. The 65th birthday of Dr J. O. Martinovský, the specialist on the genus *Stipa*, is commemorated with an account of his botanical work and a chronological list of his papers.—[D.H.K.]

Spalding, D. A. E., 1967-68, Notes on naturalists in the Sheffield area, part 2: D-G, *Sorby Record*, **2** (3), 1-14. Part 3: H-L, *Loc. cit.*, **3** (4), 1-15.

Short biographical notices of Sheffield naturalists are given. Botanists include A. A. Dallman, Erasmus Darwin (1731-1812), Richard Deakin (1808 or 9-73), Eric Drabble (1877-1933), William Falconer (1862-1943), Hilderic Friend (1852-1940) Thomas Gibbs (1865-1919), T. W. Gissing (1829-70), Leopold Hartley Grindon (1818-1904), Joseph Henderson (d. 1866), Elijah Howarth (1854-1930), W. E. Howe (d. *c.* 1891), Godfrey Howitt (1800-73), Peter Inchbald (1816-96), Henry Johnson (fl. 1880's), Thomas Knowlton (1757-1837), Larret Langley (fl. 1830's), F. Arnold Lees (1847-1921) and W. R. Linton (1850-1908).—[D.H.K.]

OBITUARIES

Schenk, Ernst, 1880-1965: *Willdenowia*, **4**, 419-421 (portr.) (1968).

Temperley, George William, *c.* 1875-1967: *Vasculum*, **53**, [3-4] (1968).

PALAEOBOTANY

CONCERT, H. J., 1967, Die Geschichte der Botanisch-Paläobotanischen Abteilung, *Senckenbergiana Biologica*, **48**, *Sonderheft C*, 1-57. Biographies are provided of many deceased German botanists who played a prominent part in the study of palaeobotany.—[D.H.K.]

DAVIS, A. J., 1967, Notes on peat deposits in the West Hyde area, Lower Colne Valley, *J. Ruislip nat. Hist. Soc. Distr.*, **16**, 55-61. Gravel washings have exposed deposits hitherto obscured by superficial sand and gravel near West Hyde, Herts. The plant remains detected are reviewed. A pronounced layer of *Pinus sylvestris* was noted with *Betula* species and *Alnus glutinosa*.—[D.H.K.]

GRUGER, J., 1968, Untersuchungen zur Spätglazialen und frühpostglazialen vegetationsentwicklung der Südalpen im umkreis der Gardasees, *Bot. Jb.*, **88**, 163-199. Studies on the late-glacial and post-glacial flora of three former lakes in the Lake Garda area, Southern Alps.—[D.H.K.]

HOLMEN, H., JOHNELS, A., MALMER, N., PERSSON, A. & SJORS, H., 1967, Peatland and peatland conservation in Sweden, *Aquilo, ser. Bot.*, **6**, 120-136.

JEFFERIES, R. L., WILLIS, A. J., & YEMM, E. W., 1968, The Late- and Post-Glacial history of the Gordano Valley, North Somerset, *New Phytol.*, **67**, 335-348.

ORLICZ, A., 1967, Szcatki róslinne z okresu rzymskiego z wykopalisk archeologicznych w wasoszu Górnym kolo Klobucka, *Folia quatern.*, **27**, 1-9. A study of plant remains of the Roman period from archaeological investigations of Wasosz Górny, near Klobuck, south-central Poland. Cultivated species identified from the deposits included *Secale cereale* L., *Triticum dicoccum* (Schrank) Schübler, *T. spelta* L., *T. vulgare* L., *Panicum miliaceum* L. and *Pisum sativum* L. Many wild species were also noted including *Pinus sylvestris*, *Rumex acetosella*, *Polygonum nodosum*, *P. persicaria*, *P. aviculare*, *P. convolvulus*, *Chenopodium album*, *Spergula arvensis*, *Plantago lanceolata*, *Galium spurium*, *Digitaria ischaemum*, *Setaria glauca* and *Echinochloa crus-galli*.—[D.H.K.]

SLADKOV, A. N., 1967, *Vvedenie. v sporovo—pyl'tse—voi analiz*. Pp. 270. Moscow. An introduction to the study of spore-pollen analysis, chiefly in the sphere of palaeobotany.—[D.H.K.]

TOLONEN, K., 1968, Zur Entwicklung der Binnenfinnland-Hochmoore, *Annls Bot. Fenn.*, **5**, 17-33.

TURNER, C., 1968, A Lowestoftian Late-Glacial flora from the Pleistocene deposits at Hoxne, Suffolk, *New Phytol.*, **67**, 327-332.

TURNER, C., 1968, A note on the occurrence of Vitis and other new plant records from the Pleistocene deposits at Hoxne, Suffolk, *New Phytol.*, **67**, 333-334.

VASARI, Y. & VASARI, A., 1968, Late- and Post-glacial macrophytic vegetation in the lochs of Northern Scotland, *Acta bot. fenn.*, **80**, 1-120.

WAATERINGE, W. GROENMAN VAN, 1968, The elm decline and the first appearance of Plantago major, *Vegetatio*, **15**, 292-296. The appearance of pollen grains of *Plantago major* and *P. lanceolata* in the pollen diagrams before and contemporary with the elm decline is, unless accompanied by pollen of *Cerealia* and archaeological material, not necessarily an indication of the presence of Neolithic man in the immediate vicinity because of the occurrence of the *Agropyro-Rumicion crispi* alliance, order *plantaginetalia maioris* in naturally unstable contact zones.—[Author's summary]

Wieserowa, A., 1967, Wczesnosredniowieczne szezatki zbózi, chwastów z Przemysla, *Folia quatern.*, **28**, 1-16. Notes on plant remains ascribed to the 11th and 12th centuries A.D. from archaeological excavations on the castle hill, Wzgórze Zankowe, Przemysl, south-east Poland. Lists of cultivated and wild species found in the deposits are given.—[D.H.K.]

HERBARIUM, LABORATORY, RECORDING TECHNIQUES, ETC.

Crovello, T. J., 1968, Key community cluster analysis as a taxonomic tool, *Taxon*, **17**, 241-258.

Runemark, H., 1968, Critical comments on the use of statistical methods in chemotaxonomy, *Bot. Notiser*, **129**, 29-43.

Sandford, H. A., 1968, Reconnaisance surveys of vegetation, *Lond. Nat.*, **47**, 19-24. A review of the various types of surveys which have been undertaken by members of the London Natural History Society. These fall into four fairly well-defined groups:—(1) intensive studies of particular species and (2) habitats, (3) Ecological surveys of specific areas, and (4) the Plant Mapping Scheme, involving the recording of the different species found in each 'tetrad' in the Society's area.

Various terms of frequency are reviewed, e.g. abundant, occasional, etc., and it is pointed out that it is sometimes very difficult to distinguish between certain terms that have been used.

Useful advice is offered in connection with future surveys.—[D.H.K.]

CLASSIFICATION, NOMENCLATURE, BOTANICAL TERMINOLOGY, ETC.

Baum, B. R., 1968, Is today's neotypification always necessary?, *Taxon*, **17**, 283-284.

Brazier, J. D., 1968, The contribution of wood anatomy to taxonomy, *Proc. Linn. Soc. Lond.*, **179**, 271-274.

Bronckers, F., 1968, Les nomenclatures en Palynologie, *Bull. Soc. r. Bot. Belg.*, **101**, 23-25. Notes on the nomenclature used in palynological studies.—[D.H.K.]

Burdet, H. M., 1968, Méthodologie cytotaxinomique: critiques et propositions, *Candollea*, **23**, 39-44. The author attempts to make a critical summary of the cytological methods used, and the results obtained therefrom in the taxonomic field. He proposes to add to the techniques used up till now the quantative analysis of desoxyribonucleic acid (DNA), and suggests the most appropriate methods to achieve this aim.—[Author's summary p.p.]

Cook, J. C., 1968, *ABC of Plant Terms*. Pp. 293. Merrow Publishing Co. Ltd., Watford. Price 25/-. A glossary of horticultural and botanical terminology.—[D.H.K.]

Cutler, D. F., 1968, Anatomy and taxonomy of certain monocotyledenous families, *Proc. Linn. Soc. Lond.*, **179**, 261-267.

Grant, W. F., 1968, Botanical editors and biochemical systematics, *Taxon*, **17**, 259-260.

McVaugh, R., Ross, R. & Stafleau, E. A., 1968, An annotated glossary of botanical nomenclature, *Regnum veg.*, **56**, 1-31.

Soo, R., 1968, Species et combinationes novae florae Europae praecipue Hungaricae, 7, *Acta bot. hung.*, **14**, 145-156. A number of new combinations are made, principally in *Odontites*, *Rhinanthus* and *Hieracium*.—[D.H.K.]

TAKHTAJAN, A., 1968, Classification and phylogeny, with special reference to the flowering plants, *Proc. Linn. Soc. Lond.*, **179,** 221-227.

TETENYI, P., 1968, The nomenclature of infraspecific chemical taxa, *Taxon*, **17,** 261-264.

THORNE, R. F., 1968, Synopsis of a putatively phylogenetic classification of the flowering plants, *Aliso*, **6,** 57-66.

VAUGHAN, J. G., 1968, Serology and other protein separation methods in studies of angiosperm taxonomy, *Sci. Progr.*, **56,** 205-222. Among recent innovations in experimental taxonomy has been the study of protein analysis in an attempt to find more empirical criteria for studies of interrelationships between families, genera and species. The author reviews the application of serological and protein separation methods in the taxonomy of higher plants.—[D.H.K.]

VAUGHAN, J. G., 1968, Seed anatomy and taxonomy, *Proc. Linn. Soc. Lond.*, **179,** 251-255. At the present time it is difficult to assess the potential value of seed anatomy in relationship to taxonomy. Data on the subject is very meagre, but the few studies that have been undertaken indicate a valuable field for further research.—[D.H.K.]

MISCELLANEOUS

AMEN, R. D., 1968, A model of seed dormancy, *Bot. Rev.*, **34,** 1-31. Studies on dormancy in seeds and some of the causes, e.g. growth inhibitors, etc.—[D.H.K.]

ARASAU, N. T., 1968, Self-incompatibility in angiosperms: a review, *Genetica*, **39,** 1-24.

BURSTROM, H. G., 1968, Calcium and plant growth, *Biol. Rev.*, **43,** 287-316.

CARLEY, H. E. & WATSON, R. A., 1968, Effect of various aqueous plant extracts upon seed germination, *Bot. Gaz.*, **129,** 57-62.

DENAEYER, DE S., LEJOLY, J. & DUVIGNEAUD, P., 1968, Note sur la spécificité biogéochimique des halophytes du littoral Belge, *Bull. Soc. r. Bot. Belg.*, **101,** 293-301.

EWAN, J., 1967, A bibliography of Louisiana Botany, *Southwestern Louisiana J.*, **7,** 1-83.

FENAROLI, L., 1967, *Gli Alberi d'Italia.* Tavole di Uberto Tosco, Milano. Pp. 320, including 100 coloured plates. Descriptions and illustrations in colour of the trees and shrubs found in Italy are given. Distribution maps of the various species are provided together with keys to their identification.—[D.H.K.]

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HENDRICKS, S. B., 1968, Photoperiodism after 50 years, *J. Wash. Acad. Sci.*, **58,** 69-74.

LAWRENCE, G. H. M., BUCHHEIM, A. F. G., DANIELS, G. S. & DOLEZAL, H. (Editors), 1968, *B-P-H Botanico-Periodicum-Huntianum.* Pp. 1063. Hunt Botanical Library, Pittsburgh, Pa., U.S.A. Price $30.00. A compendium of some 12,000 titles, comprising the world's periodical literature covering all branches of botany. The editors have endeavoured to provide (a) an internationally acceptable unambiguous abbreviation of the title of each periodical, (b) the title of each periodical, as given on the title page of the first volume, (c) the place of publication of the first volume, (d) details of series, continuance, etc. and pertinent dates, (e) Index references for each title in the Union List of Serials.

The volume is a most comprehensive work of reference and provides an invaluable source of information to all botanists.[D.H.K.]

LONERAGAN, J. F., GLADSTONES, J. S. & SIMMONS, W. J., 1968, Mineral elements in temperate crop and pasture plants, *Aust. J. Agric. Res.*, **19,** 353-364.

ORMROD, D. J. & RENNEY, A. J., 1968, A survey of weed leaf stomata and trichomes, *Can. J. P. Sci.*, **48**, 197-209. Studies on leaf stomata of 35 widespread Canadian weeds, including *Silene alba*, *Cerastium fontanum* subsp. *triviale* (*C. holosteoides*), *Stellaria media*, *Achillea millefolium*, *Matricaria matricarioides*, *Senecio vulgaris* and *Polygonum convolvulus*.—[D.H.K.]

RAO, V. S., 1968, Placentation in relation to anatomy, *Bot. Notiser*, **121**, 281-286.

ROBERTY, G. E., 1968, Logical analysis and the angiospermic families, *New Phytol.*, **67**, 349-364.

SCHULTES, R. E., 1968, The plant kingdom and modern medicine, *The Herbarist*, **34**, 18-26. A short survey of the use of drugs derived from plant species in modern medicine.—[D.H.K.]

STERN, C. & SHERWOOD, E. R. (Editors), 1966, *The Origin of Genetics. A Mendel Source Book*. Pp. xi [+ xii-xiv] + 1-179. W. H. Freeman & Co., San Francisco and London. This book is arranged in three sections. The first deals with experiments on plant hybrids, and consists mainly of a selection of letters from Gregor Mendel to Carl Nägeli on *Hieracium*, written *c.* 1866-73. The second part consists of De Vries's account of the law of segregation of hybrids, and the third, by C. Correns, deals with Mendel's law concerning the behaviour of progeny of varietal hybrids. —[D.H.K.]

LOCAL FLORAS CURRENTLY AVAILABLE FOR SALE

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0	Channel Isles. *A Check List of the Flowering Plants and Ferns wild in Alderney and its off-islets.* Transactions of La Société Guernesiaise (off-print). 1964. 21/-, postage 4d. c/o Guille-Allès Library, St. Peter Port, Guernsey.
	Wild Flowers of Herm. F. Le Sueur and D. McClintock. 1962. 1/6d., postage 4d. La Société Guernesiaise, c/o Guille-Allès Library, St. Peter Port, Guernsey.
	A Check List of Flowering Plants and Ferns wild on Sark and its off-islets. F. Le Sueur and D. McClintock. 1963. 4/-, postage 4d. Guille-Allès Library, St. Peter Port, Guernsey.
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9	Dorset. *A Geographical Handbook of the Dorset Flora.* R. d'O. Good. 1948. 25/-, postage 5/-. Dorset County Museum, Dorchester, Dorset. *Addendum No.* 1. 2/6d., postage 6d.
16, 17, 18, 19, 20, 21, 24	London Area only. *A Hand List of the Plants of the London Area.* D. H. Kent and J. E. Lousley. 1951-7. 11/6d., post free. Mrs L. M. P. Small, 13 Woodfield Crescent, London, W.5.
20	Hertfordshire. *Flora of Hertfordshire.* J. G. Dony. 1967. 42/-, post free. Hitchin Museum and Art Gallery, Paynes Park, Hitchin.
22	Berkshire. *The Flora of Berkshire.* H. J. M. Bowen. 1968. 45/-, post free. Dr H. J. M. Bowen, 20 Winchester Road, Oxford.
27-28	Norfolk. *Flora of Norfolk.* C. P. Petch and E. L. Swann. 1968. 45/-, postage 2/6d. Castle Museum, Norwich. *West Norfolk Plants To-day.* C. P. Petch and E. L. Swann. 1962. 11/-, postage 1/-. D. H. Kent, 75 Adelaide Road, West Ealing, London, W. 13.
29	Cambridgeshire. *Flora of Cambridgeshire.* F. H. Perring *et al.* 1964. 35/-, postage 2/6d. Cambridge University Press, 200 Euston Road, London, N.W.1.
30	Bedfordshire. *Flora of Bedfordshire.* J. G. Dony. 1953. 42/-, post free. Luton Museum, Wardown Park, Luton.
31	Huntingdonshire. *Flora of Huntingdonshire.* J. L. Gilbert. 1965. 7/6d., post free. Peterborough Museum, Peterborough.
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BOOK REVIEWS

The Penguin Dictionary of British Natural History. By RICHARD FITTER, assisted by MAISIE FITTER. Pp. 348. Penguin Reference Books R21. Penguin Books Ltd., Harmondsworth, Middlesex, 1967. Price 8/6.

This small but unusually comprehensive book provides a fitting companion to the *Penguin Dictionary of Biology* first published in 1951. It covers the entire field of British natural history, but the reviewer has confined himself to the botanical aspect. On this subject the author deals concisely but adequately with a variety of topics from the vernacular names of plants and their scientific equivalents, through morphological, ecological and genetical terminology to the definition of floristic elements.

A presumably unintended but useful feature of the work is its capacity to reveal to the uninitiated the species intended by such modern unfamiliar and bizarre vernacular names as Grim the Collier, Good Friday Grass and Yavering Bells. Although scientific plant names below the rank of families are excluded from the text a detailed index of species is appended.

Richard and Maisie Fitter are to be congratulated on the careful and accurate compilation of a book which, in view of its wide scope and moderate price, should be on the shelves of all British naturalists.—D. H. KENT.

Wild Flowers in Cornwall and the Isles of Scilly. By JEAN A. PATON, M.Sc., F.L.S. Pp. 122. D. Bradford Barton, Truro, 1968. Price 25/-.

Messrs D. Bradford Barton of Truro have loyally served their county with their series on local history, religion, geology and birds, now enriched by Mrs Paton's book. It is the sort of thing that can only readily be done for a 'holiday' county, and this is something of a holiday-maker's book. So, although Mrs Paton is a trained botanist and her work is scientifically sound, the flavour given by the words 'Wild Flowers' in the title runs throughout the book. It is in no sense a Flora, nor is there generally much help with identification. Indeed, dealing, as it does, with over 900 species in some 90 pages of text, the book amounts to little more than a list of plant localities; and, as it is not in systematic order, reading it straight through (as a conscientious reviewer must do) is a pretty dazzling task. The task is not made easier by the fact that turning it into continuous prose rather than a list of notes has involved much repetition of such phrases as 'can be seen on Chyanhal Moor', 'may be found near Penzance', 'the former occurs near Falmouth . . . whilst the latter grows near Porthleven'; but there is also some 'it is always a delight to find the fragrant yellow flowers of the Cowslip'.

The plan of the book is in fact ecological and phenological. Each of the five chapters is devoted to a particular habitat and arranged in order according to some half-dozen 'seasons'. For example 'moorlands, heaths and bogs in May' are dealt with on pages 79-81. This may be logical and is certainly interesting, but it is not really very helpful. The overlaps are tremendous both in time and in space: for example, plants out of all five chapters grow within a few yards of each other at Kynance Cove.

The foregoing may have suggested that it is not a book for B.S.B.I. members; but this is not true. I shall certainly want to have it with me on any future visit to Cornwall. It has much useful information about localities and is exceptionally good on the very numerous and well established aliens (especially those of Scilly) which commonly present such puzzles to visitors. There is also a good paragraph on the seven Cornish Fumitories.

It is a disappointment that the method of printing has not done justice to some fine habitat photographs—a map showing places named would have been of much greater value than these. On the other hand, there is one good index, the author having avoided the annoying practice of indexing English and Latin names separately.
—J. OUNSTED.

British Sedges. By A. C. JERMY & T. G. TUTIN. Pp. 199 + 62 full-page figs., 32 text figs. Botanical Society of the British Isles, London. 1968. Price 17/6d.

Sedges, second only to Grasses in their evolutionary and ecological interest, have received 'Cinderella' treatment in the past. A detailed yet compact and readable work devoted entirely to the genus *Carex* is therefore very welcome, and one written by two of the leading authorities on this group and published by the B.S.B.I. is doubly so. The authors suggest in their introduction that this may be the first of a series of such handbooks: let us hope so, especially if they are all up to this standard. We might hope to see the rest of the Cyperaceae (in the present work, alas, only mentioned in the key to non-flowering specimens) sharing a companion volume with the Juncaceae.

Comparison with C. E. Hubbard's *Grasses* (Penguin, 1954) is inevitable although the B.S.B.I. had no hand in that invaluable publication. There are many similarities in treatment and format, and the present work has inherited weaknesses as well as virtues from Hubbard.

After fairly short sections on identification, structure, ecology and classification, the main body of the book falls into two parts: separate keys based on fruiting specimens and on non-flowering specimens respectively, and then a detailed descriptive treatment with a full page illustration for nearly every British sedge; the last few pages of the book includes some comments on alien and extinct species and dubious records, a selected bibliography, a glossary and indices to English and Latin names.

The whole work bears the authoritative stamp of two authors who really know the plants they are writing about (I particularly like Jermy's treatment of the *C. nigra* complex) and know how to write about them with clarity and precision. The keys are well thought out and well worded, the one based on vegetative characters being the first readily available in the British literature; it should prove exceptionally useful to ecologists. Considerable care has been taken to allow for variation especially in common species, some of which (e.g. *C. flacca*, *C. nigra*, *C. rostrata*) come out in three different places each.

The full-page illustrations of each species are packed with useful and often unusual detail—of especial value are the drawings of ligule shapes and of leaf cross-sections—and for delicacy and liveliness the best of them bear comparison with those which Miranda Bødtker drew for Nordhagen's *Norsk Flora*. The book is reasonably priced for its wealth of illustrations, and is a genuine handbook in both its size and its durability (in spite of limp covers).

The criticisms which follow are relatively trivial, dealing for the most part with presentation rather than content. On the latter aspect I found the treatment of the *C. muricata* group somewhat unsatisfactory (but much work is still needed here) and the section on ecology (pp. 24-26) so brief as to be misleading; probably a treatment based on phytosociological groupings would have been more useful here, since the ecological notes under the description of each species are for the most part excellent. I could find no typographical errors, but 'ramets', correctly spelled in the glossary is given two 'm's where it occurs in the text; and surely the definition of vivipary as 'the production within the ovary of a seedling without prior fertilisation' is wrong?

Having to spend quite a lot of my time teaching beginners to use analytical keys—and to construct them—I have strong prejudices on the subject of key design. I deplore the fact that the keys in the present work follow the common continental layout: paired alternatives are separated, often by several pages, and successive steps in the analytical process are marked by progressive indentations of the margin which leave the ultimate diagnoses tapering down the page like the tale of Alice's Mouse. Students find keys much easier if they can read adjacent alternatives consecutively before they go on to the next stage.

The drawings of whole plants are most successful where the species are small and delicate (e.g. *C. limosa*) and least so for the grosser kinds (e.g. *C. pendula*). It is a great pity that some of the best figures are marred by bad printing, and the sketches of inflorescence types and flowers (figs. 16-27) are not up to the general high standard of draughtsmanship.—C. A. SINKER.

The Flora of Berkshire. By H. J. M. BOWEN, with sections on Fungi by F. B. Hora, and Bryophytes by E. W. Jones. Pp. 389. Holywell Press, Oxford. 1968. 45/-.

This is the first new Flora of this well-worked county for 70 years. It is in the great tradition of British county Floras covering not only the vascular plants but also the stoneworts, lichens, fungi and bryophytes, thus satisfying a wide spectrum of readers. In addition the author has included very useful chapters on geology and soils, climate, fresh-water habitats, geographical relationships, ecology and land use. This latter chapter includes an interesting table giving data on the area of the county under different land usage in which both built-up land and different types of agriculture and vegetation appear. The chapter on geographical relationships and changes in the flora is particularly well done covering as it does the bryophytes and lichens as well as the flowering plants.

A feature which reflects the professional interests of Dr Bowen is the inclusion of full chemical analyses of soils and fresh water from different habitats in the county. A short chapter on four of the more recent Berkshire botanists is intended as a supplement to the historical chapter in Druce's *Flora* and in fact begins with a very short biography of Druce and concludes with one of our late past President, Dr E. F. Warburg, who contributed so much to the knowledge of the bryophytes and vascular plants of the region.

The bulk of the Flora, which would be regularly consulted by those botanists working in the area, is on a straightforward traditional basis with an ecological note on the distribution of the species following an indication of the plant's status in the county and then a selection of localities if the species has been recorded from 25 or fewer of the 5 × 5 km Grid squares of which there are 97 in Berkshire. This size of Grid square is unfortunately unique to this Flora as the author himself has shown in a paper on the choice of Grid squares, but only the total number of squares in which a species occurs is quoted instead of the mention of each square by number which is so frustrating in some new county Floras.

The inclusion of so many species which Dr Bowen describes as colonists, aliens or casuals is not, in the reviewer's opinion, very desirable but it certainly inflates the total number. These species are best included in a special section or otherwise a more thorough winnowing could have been undertaken if a minimum time qualification for their persistence in one site had been required before they were included with native species and established introductions.

In the pages of figures at the back of the book one might have wished for a larger geological map and an outline map showing the major towns and sites of special botanical interest. The line indicating the 'minimum temperature for plant growth' at 6°C in Fig. 2 is misleading—bryophytes certainly grow at lower temperatures and many angiosperms require higher temperatures. In the annual rainfall variation Figure there is no indication of what the units are on the vertical scale.

The fifty-six pages of distribution maps are not the most successful or useful part of the Flora. The scale is too small to give the reader any more than the broadest idea of the distribution of the species depicted and the conventions used to show this distribution have a dazzling effect in the over-obtrusive grid covering each outline map. Fewer maps, covering selected species to show different types of distribution, with a geological or soil map on the same scale for attempted correlations, would have been much more valuable. The distributions of such planted species as *Tsuga heterophylla* and *Syringa vulgaris* surely do not warrant map space.

Apart from the reservations on the maps and figures the contents of this Flora will meet a need for many years though the survival powers of the binding are in some doubt because the back of the review copy has not withstood its relatively short period of use with any fortitude. Otherwise the production is serviceable and, with its many useful references scattered throughout, this Flora will be indispensable to all resident botanists and to those visiting the county.—P. J. WANSTALL.

OBITUARIES

CANON GEORGE AIDAN KINGSFORD HERVEY (1893-1967)

The death on 14th June, 1967, of Aidan Hervey robbed this society of a distinguished member and many naturalists of a much-loved friend. He was a man of numerous talents and wide sympathies and interests and will be sorely missed in many spheres.

Born on the 19th July 1893, George Aiden Kingsford Hervey was an exhibitioner at Trinity College, Oxford, obtaining his B.A. in 1916 and his M.A. in 1920. He was ordained a priest in 1923. His career in the church embraced experience of many kinds of parish, from an urban area in Leeds to the hills of the Lake District. From 1934 to 1943 he was chaplain at Bryanston School, where his great enthusiasm and his gifts as a teacher made natural history one of the school's foremost interests. In 1943 he returned to his beloved Lakeland—he had been vicar of Buttermere in the 1920's—as Vicar of Gilsland and Assistant Director of Religious Education to the Diocese of Carlisle, and in 1946 became rector of Great Salkeld, a post he held until shortly before his death. He was made an honorary canon of Carlisle Cathedral in 1950.

He was a most active and energetic man, caring for his parish, visiting schools of all kinds, organizing conferences for teachers and serving as chairman of the committee which drew up the *Agreed Syllabus of Religious Instruction* for the schools of Carlisle, Cumberland and Westmorland. Yet he found time to write a book, *The Staircase to Truth* (1956), to give highly successful evening classes on religious and natural history subjects, and to be an active field naturalist. He served on the Council for Nature, was a Regional Representative of the Royal Society for the Protection of Birds and for some years, until 1958, edited *The Field Naturalist*, but it is perhaps as founder and first chairman of the Lake District Naturalists' Trust that he will be chiefly remembered.

Aidan Hervey was one of the last of the great naturalist clergymen, in the Gilbert White tradition. An excellent field botanist, he neglected no aspect of natural history and those who attended his field courses will remember happy evenings around his moth trap. He was, nonetheless, in touch with modern ideas and problems and was an ardent conservationist. His great love was the mountains of the Lake District, his knowledge of which was unrivalled. Although he was 73 when he died he regularly, until his last illness, climbed Helvellyn (his special favourite) with parties, and there were many younger naturalists who found it hard to keep pace with him. His field notes and records of these expeditions are now in the care of the Lake District Naturalists' Trust.

There must be many young—and not so young—naturalists who owe their interest to his inspiration and enthusiasm, and his helpfulness and willingness to answer queries will be remembered with affection and gratitude. He was a most generous, kindly and hospitable man, a true Christian, and was loved and respected by all who knew him. Our sympathy goes to his family in their sad loss.

His many friends may like to know that the Lake District Naturalists' Trust has established a fund with which it is hoped to buy a suitable piece of land as a memorial to him. Contributions may be sent to the treasurer, J. G. Aynscough, North Heads, Casterton, Carnforth, Lancs.—J. SMALL.

Commander RUSSELL DUDLEY-SMITH (1912-1967)

Commander Russell Dudley-Smith, O.B.E., R.N., who died on October 6th, 1967 at his home in Winchcombe, Gloucestershire, after a long illness, was only 55. After service in the Royal Navy he retired in 1946 to take up an appointment with the Foreign Office and became head of a division of G.C.H.Q., Cheltenham.

He soon became interested in field botany especially in vascular plants, but latterly also in lichens, and in 1961 embarked on a detailed survey of the vascular flora of the 10 km square SP/02 in which Winchcombe is situated. With Mrs Dudley-Smith he recorded the distribution of 641 different species, over 100 of which did not appear for this district in the *Atlas of the British Flora*.

His records, now in the care of Mrs Dudley-Smith, were kept with scientific care and accuracy recording the distribution of all species on a 1 km square basis and maintaining a card index. In order to show how distribution in the area is affected by geological and physical features his records were also plotted on sheets printed with 1 km grid over outline geological maps.

He was a keen member of the Gloucestershire Trust for Nature Conservation and was involved in the management of some of the county's Nature Reserves as well as being the Trust's local representative for the Winchcombe area. Although a very busy man he could always find time to help others with botanical problems of identification and he would go to much trouble to this end.

Cdr. Dudley-Smith was much looking forward to his retirement when he could devote himself more fully to Gloucestershire botany and he realised that future recording would have to be on the 'tetrad' system as place names alone were too vague for accuracy.

Those who knew him appreciated keenly his detailed knowledge of the Cotswold flora. His modesty, enthusiasm and charming personality made it a real pleasure to join his field meetings and to engage in botanical discussion with him. His passing is a severe loss to botany, not only locally but also in the wider national field.

—D. E. DE VESIAN.

WINIFRED BOYD WATT née de LISLE (1878-1968)

Winifred Boyd Watt, who died on January 8th, 1968, was a woman of wide interests and knowledge, literary, historical and archaeological as well as scientific. In early life her chief interest seems to have been literary. She published a book of poems, and became a Fellow of the Royal Society of Literature, but gradually her love for Nature asserted itself and she became passionately interested in birds and animals.

When she married Hugh Boyd Watt, himself a keen ornithologist, she was able to go with him on many expeditions to various bird sanctuaries round the shores of Britain and Western Europe, thus increasing her knowledge and keenness. Wherever she went she made friends and contacts and these she was able to use in the cause of Natural History. She was on the Council of the Zoological Society of London for years and for a time was secretary to Sir Julian Huxley.

Her husband became ill at the beginning of the War and they moved to Bournemouth from London, and after his death she continued to live there, becoming a member of the Bournemouth Science Society and eventually its President. She was also a founder member of the Selborne Society, and through the many contacts she thus made she was able to organise a most successful Gilbert White Exhibition in Bournemouth.

About 1942 she joined the Wild Flower Society, with little botanical knowledge but a keen determination to learn, and set herself with single minded enthusiasm to seeing the British Flora, an aim from which she never wavered and pursued to within a few years of her death.

In 1946 she joined the Botanical Society and Exchange Club of the British Isles and thereafter was a most regular attender at meetings, both in London and in the field, travelling from one end of Britain to the other almost non-stop throughout the summer months, and she even attended the A.G.M. and Exhibition Meeting of the B.S.B.I. in her 88th year.

A born organiser, she loved arranging trips to see rare plants, making all the arrangements for travel and hotels and armed with maps and notes, permits and letters of introduction. With her and a few others I visited Ben Lawers, Teesdale, the Burren, The Channel Islands and The Lizard. Her determination not to leave a place till the plant was found was remarkable, and I remember an entire day spent on hands and knees looking for *Exaculum pusillum*, and her very real distress when we had to call off the hunt with the minute quarry still unfound. She was then in her late seventies, but her energy was amazing.

She was a great conversationalist and her interest in people was as intense as it was in plants. She had met and known so many eminent men and women, particularly scientists, and her memory was quite remarkable. So deaf, but undaunted, she retained her charm and enthusiasm to the end of her long life, dying within three months of her 90th birthday on the 20th March.—B. M. C. MORGAN.

REPORTS

WELSH REGION REPORT FOR 1967-1968

CONSERVATION

We have been concerned with the continual threat to and erosion of habitats. Dr Savidge has carried out work on the plant communities of the doomed Upper Towy valleys and meetings have been held to assess the relative values of threatened reservoir sites in Montgomery. At an appeal in Brecon for permission to develop the hitherto unspoiled end of Llangorse lake two members of the B.S.B.I. gave botanical evidence of the scientific importance of the lake. The Minister later rejected the appeal.

MEMBERSHIP

This is fairly static. We have had six resignations and two new members but migration from England has kept us at the 1967 level.

COUNTY RECORDER

Mr Michael Porter of Christ's College, Brecon, has been appointed Recorder for Brecon and has joined the Committee.

BULLETIN

A scheme for an inter-regional bulletin was passed in Committee but rejected by Council which considered that other regions would not accept periodic responsibility for production. The *Welsh Regional Bulletin* will appear in January and August, the editors being Dr Savidge and Mr Harrison. Members are urged to provide material.

COMMON LAND

A ruling was obtained from the Minister, through the Council for Nature, that to avoid confusion scientific interest should not be recorded until the legal registration had been effected and boundaries defined. The Minister will then consult with the interests concerned as to information to be recorded.

COUNCIL FOR THE PRESERVATION OF RURAL WALES

At the annual Conference of the C.P.R.W. held at Aberystwyth in March, the Welsh Region put on an excellent Exhibition including photographs generously loaned, distribution maps, living material, and a very effective poster by Fr Francis Harpin.

RECORDS COMMITTEE

Mr Harrison has been appointed to represent Wales on this Committee.

CHANGE OF OFFICERS

Dr Savidge is now General Secretary and Mrs Vaughan is Meetings Secretary.

—I. M. VAUGHAN.

SOUTH-WEST REGIONAL MEETING, 1968

This meeting, which was organised by Mr and Mrs A. D. Hallam, was held at the Castle Museum, Taunton, on the week-end of Friday, 5th to Sunday, 7th July. The President took the chair at the business meeting for which there were apologies for absence from the Honorary General Secretary, Mr D. E. Allen, and the Honorary Meetings Secretary, Mrs M. Briggs. 14 members were present. There was only one nomination, that of Mr C. S. Downer, for election as regional representative to serve on the Council of the Society. Mr Downer was unanimously elected. There was no other business but questions were asked on recent changes in the local organisation of the Society.

A number of other meetings were held in connection with the Regional Meeting. At a session on Friday evening at which the chair was taken by Mr A. D. Hallam an illustrated lecture was given by Mrs Pat Wolseley on 'Holme Moor: a *Cladium* Fen', which she has studied intensively during the past two years.

On Saturday morning a visit was made to Holme Moor where Mrs Wolseley demonstrated the very distinct zones of vegetation and drew attention to the various plant species associated with them. The latter part of the morning was spent on a heathy stretch of common land known as Langford Heathfield. In the afternoon a visit was made to acid moorland at Hense Moor which supports a flora in sharp contrast to that at Holme Moor. Members present will remember clearly the abundance of *Cladium* and *Phragmites* at Holme Moor compared with that of *Narthecium* at Hense Moor, which also provided the three British species of *Drosera*.

At an evening session Captain R. G. B. Roe outlined the progress made in a revision of the *Flora of Somerset* based on a division of the county into 'tetrads'. He made generous acknowledgment of assistance he had so far received, especially from Mr H. W. Boon in the central part of the county and appealed for similar help in the western part. Mr Hallam at very short notice gave a lecture on the flora of Corsica illustrated by delightful slides of natural scenery and plants taken by him and his wife. At the conclusion of this session the President on behalf of all present thanked the lecturers and leaders of the field meetings and Mr and Mrs Hallam for having organised so fruitful and enjoyable a week-end.

On Sunday an early start was made to explore blanket bog on Exmoor at the head of Ember Combe. As morning drizzle soon gave way to hill mist and persistent rain the meeting was finally abandoned at about mid-day.—J. G. DONY.

FIELD MEETINGS 1968

SWITZERLAND AND ITALY. 28TH JULY-8TH AUGUST (JUNIOR MEETING)

Leaders: C. J. Cadbury, J. Ounstead, and Dr C. T. Prime

This was the sixth overseas meeting to be arranged by the Junior Activities Committee and the second to be based on Bourg St. Pierre in the Canton of Valais. Due to the kindness of Professor Chodat of the Institut de Botanique in the University of Geneva, seventeen members were again able to stay in the University's chalet, La Linnaea. The party included none of those who had attended the 1960 meeting (*Proc. bot. Soc. Br. Isl.*, **5**, 75-8, (1963)) but we greatly appreciated the company and local knowledge of François Burnier who joined us. Since the Society's first visit the St. Bernard Tunnel has been opened with its Swiss entrance above Bourg St. Pierre.

The train and bus ride up the long Val d'Entremont from Martigny enabled us to observe the change in the predominant forest trees as we ascended. Down towards Martigny in the Rhône Valley, below 700 m., the woodland was largely composed of *Betula verrucosa* but this was successively replaced by *Fagus sylvatica*, *Pinus sylvestris*, *Picea abies* and finally *Larix decidua* at about 1750 m. In Britain, this concept of altitudinal zones is usually less easy to recognize. *Pinus cembra* appeared to be very local round Bourg St. Pierre but a family of nutcrackers, *Nucifraga caryocatactes*, were constantly visiting the Arolla Pines near the chalet to extract the large seeds from the resinous cones.

The chalet, which provided an admirable base, is perched above Bourg St. Pierre on what appears to be a 'roche moutonnée'. Both this and Les Rochers de Raveyres, just below the village, while having comparatively gentle southern slopes are steep and rugged on their northern sides. On the sun-baked, south-facing aspect *Trifolium alpestre*, *Laserpitium halleri*, *Pilosella peleteriana*, *Veronica spicata* and somewhat surprisingly *V. fruticans* were prominent. *Sempervivum arachnoides* and four species of *Sedum* formed a colourful association on the dry rocks which were overhung by sprays of *Cotoneaster integerrima* and *Amelanchier ovalis*, and the characteristic tufts of *Festuca varia*. It seemed incongruous to see *Hippocrepis comosa* and *Orchis ustulata* growing in close proximity to such calcifuge plants as *Calluna vulgaris*. The northern sides of these outcrops were forested and in the damp gullies there was lush 'megaphorbiée'' vegetation which included *Cicerbita alpina* and *Stellaria nemorum*. While making a steep descent from Les Rochers de Raveyres we had the unusual experience of struggling through a thicket composed of *Ribes spicatum*, *R. alpinum* and three bushy species of *Lonicera* (with *L. xylosteum* the most frequent).

Two handsome but local plants round Bourg St. Pierre were *Lathyrus laevigatus* (*L. lutea*) with pods that were similar to those of runner beans, and *Rhaponticum scariosum* with a capitulum that might come handy as a knobkerrie. A colony of the *Rhaponticum*, recorded in H. Jaccard's 1895 *Catalogue de la Flore valaisanne*, has narrowly avoided being exterminated by the dam construction above the village.

Of the areas within walking range of Bourg St. Pierre we visited both the Valsorey and the Combe de L'A twice. A ramble up the lower parts of the Valsorey not only enabled us to familiarize ourselves with commoner alpine species but produced *Viola rupestris*, *Orobanche reticulata* growing on *Carduus defloratus* and *Veronica dillenii*, a rare mountain segregate of *V. verna* which we saw on several occasions at lower altitudes. *Juncus filiformis*, *Blysmus compressus* and the tufted *Carex davalliana* were growing by rivulets at nearly 2,000 m. Between this altitude and 2,200 m. we passed through a zone of scrub willows in which *Salix helvetica*, with leaves silvery white on the underside, and *S. hastata* were predominant. In order to make the steep ascent of the rocks at the head of the valley we took a path more suitable for chamois (which were not uncommon in these Alps). The presence here of *Leontopodium alpinum* and a robust vetch, *Astragalus frigidus*, was indicative of calcareous pockets among slightly acid soils.

The moraines of the Valsorey Glacier provided a rewarding hunting ground with an opportunity to compare *Artemisia laxa* with *A. genipi*, plenty of *Campanula cenisia* (which like *A. genipi* seemed to grow on the cooler north or west-facing slopes of debris), *Geum reptans* (*Sieversia reptans*) on coarse scree, and for those prepared to stoop low enough, *Poa laxa*, *Herniaria alpina* and *Hutchinsia alpina*. On the sand deposited by the glacial streams there was an interesting association with *Juncus triglumis* and six species of *Carex* including *C. bicolor* and *C. lachenalii*.

A stiff climb over the high ridge to the west of Bourg St. Pierre provided us with a magnificent view into the Combe de L'A. The stream running down this valley has cut its course along a fault line leaving slopes of mica schist with a calcifuge flora to the east, and crags and screes of almost dazzling white limestone on its west bank. The change in the flora across the stream was quite as spectacular as a first glance at the rock formations suggested. *Saxifraga caesia* and the local *S. diapensioides* clung to the limestone as if they were encrustations while the dwarf *Rhamnus pumilus*, *Kernera saxatilis* and *Potentilla caulescens* somehow found a root-hold in the fissures. On the screes below the rocks we saw a number of plants which were absent from the schist. *Gypsophila repens*, *Gentiana clusii* and *Carex firma* were examples of species which substituted for their calcifuge counterparts—*Silene rupestris*, *G. kochiana* and *C. sempervirens* respectively. In addition to *Leontopodium*, which was plentiful, there was a good representation of orchids with the short-spurred *Gymnadenia odoratissima*, *Chamorchis alpina*, a single plant of *Nigritella rubra*, *Epipactis atrorubens* and some fine flowering spikes of *Cephalanthera rubra*. In two places a splash of violet indicated a patch of *Scutellaria alpina* and the unfamiliar fan-shaped leaves of *Viola pinnata* were seen projecting from one rock crevice. So late in the summer it was pleasant to come across a damp hollow where many 'alpines' were still flowering. Those of us who had been to Teesdale were reminded of certain Widdybank flushes by the presence of *Bartsia alpina*, *Primula farinosa* and *Gentiana verna*. The *Tofieldia*, however, was *T. calyculata* not *T. pusilla*.

There were two opportunities to botanize on either side of the Col du Grand St. Bernard. For the few that chose a fine day there was a view across to Mont Blanc (and a 'bank holiday' crowd). A day later, the Col, enshrouded in cloud, was a very different place. The hybrid *Ranunculus aconitifolius* × *R. glacialis* thrives among garbage thrown out below the Hospice. We were able to detect where the snow lies late by the pale green foliage of *Alchemilla pentaphyllea*. The grim screes at 2,400 m. produced five species of *Poa*—both viviparous and non viviparous *P. alpina*, *P. supina*, *P. cenisia*, the adaptable *P. nemoralis* and ubiquitous *P. annua*. For those who had seen *Allium schoenoprasum* among rocks on the coast and river banks in Britain it was something of a revelation to see this showy leek flourishing in high alpine bogs. In the damp pastures *Gagea fistulosa* and *Paradisea liliastrum* were still flowering along with the local *Pedicularis incarnata*. A rather drab crucifer proved to be the uncommon *Murbeckiella pinnatifida*. The discovery of a patch of the rhizomatous *Juncus arcticus* on the south side of the lake in the Col confirmed an old record in Jaccard's Catalogue.

At the expense of a 5 a.m. rise and by using the St. Bernard Tunnel we managed to have a day botanizing in the Cogne Valley at the edge of the Gran Paradiso National Park in Piedmont. Almost as soon as we had arrived at Lillaz it was clear that the base-rich schists of the area had an exceptional flora. The dry, south-facing slopes had some elements of garrigue vegetation with the poisonous *Juniperus sabina* in abundance, *Stipa pennata*, *Anthericum liliago*, *Allium sphaerocephalum*, sheets of yellow *Ononis natrix*, *Armeria plantaginea*, *Galium rubrum*, the blue *Lactuca perennis* and quantities of *Sempervivum tectorum*. *Alyssoides utriculata* with greatly swollen siliculae, *Silene vallesia* whose petals are shell pink on the upper surface and dusky red below, both *Bupleurum ranunculoides* and *B. stellatum*, *Scutellaria alpina*, *Nepeta nepetella*, *Campanula spicata* and *Hieracium tomentosum* were among the plants that caught the eye. We also observed a colony of the very local *Primula pedemontana*. An outstanding feature of the valley was the diverse range of *Astragalus* species with the spiny *A. sempervirens*, *A. cicer* with almost globular pods, the vetch-like *A. monspessulanus*, *A. exscapus* with golden yellow flowers clustered close to the ground at the base of the hairy leaves, and most beautiful of all, the lupin-like bushes of *A. australpinus* (*A. alopecuroides*). Our picnic, overlooking a low thicket of *Myricaria germanica* on the stony banks of a stream, was temporarily interrupted when some ibex, indigenous in the National Park, were sighted on the crags overlooking the valley.

As a change from alpine vegetation we visited the Val d'Aosta in Italy where by August the garrigue on the south-facing slopes had a thoroughly parched appearance. Gignod and Porrasan, the two areas to the north of Aosta that we selected for examination, had fairly similar associations of 'Mediterranean' plants with *Quercus pubescens*, *Prunus mahaleb*, *Petrorhagia saxifraga* (*Tunica saxifraga*), *Ononis pusilla*, *Astragalus onobrychis*, a form of *Bupleurum ranunculoides* with grass-like basal leaves, *Odontites lutea*, *Hyssopus officinalis*, *Achillea nobilis* and the yellow-flowered *A. tomentosa*. Abandoned terraced fields had been colonized by *Kochia prostrata* and the annual composites, *Xeranthemum inapertum*, *Crupina vulgaris*, and *Filago arvensis*. Several members of the party independently associated the vegetation of the cooler gullies with that of Surrey chalkland, complete with *Primula veris* and even *Ajuga chamaepitys*. The marble screes above Châtillon provided a rather different habitat. A feature of this area was the abundance of two ferns, *Cheilanthes marantae* (*Notheclaena marantae*) and *Asplenium septentrionale* which was growing like grass among the boulders along with *Alyssum alpestre*, *Oxytropis pilosa*, *Thymus vulgaris* and *Lonicera etrusca*. The hirsute *Onosma helveticum* was growing locally in some quantity among *Quercus pubescens* scrub.

On our final day, before boarding the train for home, we explored Les Follatères, an arid rocky slope which projects out into the Rhône Valley close to Martigny. In spite of being north of the Alps the vegetation was of the garrigue type with many species which we had already seen in the Aosta and Cogne valleys in Italy. The scrub was composed of *Quercus pubescens* and *Cornus mas* with attractive red berries. In the dry grassland we were able to acquaint ourselves with such 'East Anglian' species as *Silene otites*, *Scleranthus perennis*, *Seseli libanotis*, *Melampyrum cristatum*, *Veronica spicata* and *Phleum phleoides*. These were growing along with *Critinaria linosyris* (*Linosyris vulgaris*), *Trinia glauca*, *Geranium sanguineum* and *Polygonatum odoratum* which British botanists normally associate with Devonian or Carboniferous limestones. *Lychnis coronaria*, which is such a showy garden border plant, *Silene armeria*, *Bupleurum falcatum* and *Scorzonera austriaca* were also among the notable plants that we observed. Two unfamiliar grasses which set us an identification problem eventually proved to be *Tragus racemosus* and *Diplachne serotina*, both very local in Switzerland.

This field meeting certainly emphasized the paucity of the British flora and it was valuable to be able to study a number of well-defined plant associations not present in our islands. Though the number of species that we encountered was almost overwhelming it was good to see individuals tackling some of the problematical genera like *Rhinanthus*.

Moreover, we all appreciated the opportunity to familiarize ourselves with British rarities such as *Oxytropis campestris*, *Phyteuma spicatum* and *Homogyne alpina* which we saw every day.—C. J. Cadbury.

ENGLAND

VIRGINIA WATER, BERKS. AND SURREY 12TH MAY

About thirty-five members attended this outing, at which Dr Perring demonstrated his scheme for scoring populations of *Symphytum*. The party was shown *Lycopodium clavatum* and *Equisetum sylvaticum* in Berks, and *Vicia lathyroides* and *Thelypteris limbosperma* in Surrey. Interesting aliens noted included *Adiantum pedatum* on a small bridge, and *Lysichiton americanus* and *L. camtschatcense* in several valleys draining into Virginia Water, all on the Surrey bank.—H. J. M. BOWEN.

BURY ST. EDMUNDS. 1ST-3RD JUNE

A successful meeting of twenty-eight members met at Bury St. Edmunds from June 1st-3rd at the invitation of the Breckland Flora Committee of the Nature Conservancy. The object of the meeting was twofold: to give members an opportunity to see some of the Breck species and to assist with the recording of the Breck flora on a 1 km basis.

Two days were spent in recording when 15 squares were visited. The searches to complete the squares will be done by local recorders. The writer was in company with Dr C. E. Hubbard and there was a natural diversion to the grasses. The common occurence of *Poa subcaerulea* and *P. angustifolia* in the Elveden-Icklingham area was noted. *Poa nemoralis*, very infrequent in Suffolk, was found under planted Beeches and *Bromus diandrus*, which is spreading throughout the Breck, was also found. It is estimated that Dr Hubbard collected no less than ¼ cwt of grass specimens over the weekend!

On June 2nd members met at Tuddenham Gallops where the Suffolk Trust for Nature Conservation has acquired a small area of land which is being treated as 'open Breck' for the cultivation of some of the Breck species which are losing stations. *Veronica praecox*, *V. verna*, *V. triphyllos*, *Euphorbia cyparissias* and *E. esula* were seen. The party moved on to Foxhole Heath near Little Eriswell where the distribution of *Festuca glauca* was studied in relation to the barren areas of *Festuca ovina*. To complete the day, the party crossed into the Norfolk Brecks to Weeting Heath where rabbit grazing was much in evidence. *Dianthus deltoides* was seen and the only known station in the Breckland of *Veronica spicata*.—P. J. O. TRIST.

TARDEBIGGE RESERVOIR AND ROUNDHILL WOOD, WORCESTERSHIRE. 8TH JUNE (JUNIOR MEETING)

A party of six met at Tardebigge, south-east of Bromsgrove, and proceeded along the Worcester and Birmingham Canal, which descends steeply through a series of locks, to Tardebigge Reservoir. Common plants, aquatic and terrestrial, abounded, but it would seem that most of the rarities for which the reservoir was once locally famous are now extinct. *Blackstonia perfoliata* by the reservoir and *Barbarea stricta* by the canal were the only uncommon species found.

After an *al fresco* lunch, the meeting moved by car to Roundhill Wood, some eight miles to the south. This beautiful and unspoilt locality is one of several oakwoods on the lias in this corner of the county. *Lysimachia nummularia*, *Paris quadrifolia*, *Listera ovata* and *Platanthera chlorantha* were seen here, along with many other woodland calcicoles.—J. A. KIERNAN.

ISLE OF PURBECK, DORSET. 14TH-16TH JUNE

Although the western parts of Britain are not so rich in orchids as the south-east, certain areas such as the Isle of Purbeck contain very interesting populations of *Dactylorhiza*, as well as other orchids. The aim of this meeting was to study the populations of *Dactylorhiza* in the Isle of Purbeck in an attempt to see the problems involved in a group of plants still in an active state of speciation.

Thirty-six members attended the meeting and the good weather enabled us all to appreciate the varied nature of the Isle of Purbeck. On the first evening the Nature Conservancy Regional Headquarters at Furzebrook kindly allowed us to use their Library, where Dr Chapman, a heath ecologist, and Mr Summerhayes gave introductory illustrated lectures on the vegetation of the Isle of Purbeck and the orchids we hoped to find.

The first place visited was Hartland Moor National Nature Reserve where, in the company of the Warden Naturalist for Dorset, we saw *Dactylorhiza praetermissa*, *D. incarnata* and *D. maculata* subsp. *ericetorum* as well as many other interesting bog plants. Along the roadsides near Hartland Moor were hybrid swarms of *D. praetermissa* and *D. maculata* subsp. *ericetorum*. A large colony of *Epipactis palustris* was also seen on a very dry roadside verge.

After lunch we visited a disused clay pit where there was a very fine population of *D. fuchsii* and *D. praetermissa*, with many hybrids. We then proceeded to the limestone downs at Durlston Head near Swanage where we saw *Ophrys apifera* and *Anacamptis pyramidalis*.

In the evening Mr P. B. Collins showed a selection of his transparencies of European orchids and there was an opportunity to discuss the various plants seen during the day and also those brought by various members of the party from other localities.

The next morning we visited Studland Bay National Nature Reserve where a very interesting population of *Dactylorhiza* is growing. Its exact identity is not known for certain, but it is probably a complex hybrid, perhaps involving three species. It is hoped to carry out cytological work in the future to ascertain its true nature.

For those returning in an easterly direction, the final site we visited was at West End near Southampton where, in addition to the four *Dactylorhiza* species commonly seen in southern England, *D. purpurella* was also present, not in very great quantities as a pure species but entering into the parentage of many hybrids. This was probably the last opportunity of seeing this site before it is destroyed by the new south coast road and an increase in pig farming.—P. F. HUNT.

DURHAM. 19TH-22ND JULY

The Rose meeting began on a day of torrential rain. Ten members were drenched as they negotiated the Magnesian limestone scrub in the Mainsforth area of Durham. Incidentally this is one of the best bits of Magnesian limestone in the North of England. Over the years the writer has listed nearly fifty vars. of nine Rose species in three 'tetrads' in this area. We saw many of these forms on the Saturday and were fortunate in having Dr Melville to demonstrate how some vars. tied up neatly with the descriptions in Wolley-Dod's monograph whilst others were undoubtedly complex hybrids. The scrub provided us with two fascinating bushes of *R. afzeliana* × *pimpinellifolia* only a few yards from each other, one with *R. afzeliana* as the male and the other with *R. afzeliana* as the female parent. Another interesting find was a single bush of *R. micrantha*, at its Northern limit, and now almost extinct in the country.

On our second day Mr J. Thompson, a local botanist, led us to some of the most interesting sites discovered by the late J. W. Heslop-Harrison. There were many bushes of a downy Rose described in 1932 as *R. mollis* var. *fallax* but later changed for nomenclatural reasons to var. *relicta*. It seems to have affinities with both *R. sherardii* and *R. villosa*. According to J. W. H.-H. it has a chromosome number of 28. This variety has red-tipped buds and white petals streaked with red externally. *Rosa pimpinellifolia* × *sherardii* was flourishing at Cassop after being known there for forty years.

Teesdale and Weardale provided many more varieties on the Monday the most notable being *R. coriifolia* var. *obovata* as yet unrepresented in the Kew collection.

The author would like to thank Mrs Gibby for arranging laboratory accommodation in the University and Dr Todd for entertaining us to tea on the Sunday. All would wish to thank Dr Melville for putting his extensive knowledge at our disposal over the three day course. He was able, we felt, to demonstrate his matured view that there is a stable core of recognisable varieties which could be mapped. At the same time those of us who have studied roses for a few years feel that even this will only be possible if Dr Melville can find time to produce a revised edition of "Wolley-Dod", incorporating all the extensive knowledge which he has gained of this genus in his thirty-four years at Kew.—G. G. GRAHAM.

HAMPSHIRE. 3RD-4TH AUGUST

The fourth Mapping Meeting held in connection with the new Flora of Hampshire was based on Salisbury in order to cover the west of the county. About seventeen members attended. It was a great pleasure to have the President with us, and he took the chair at the preliminary Meeting on Friday evening. We were also very pleased to have the company and help of the author of the *Flora of Wiltshire*, Mr J. D. Grose, and Mrs Grose. For the recording, members were divided into groups, and allocated two areas for each day, so that as much country as possible was covered. A meeting was held each evening at the headquarters hotel, to discuss the day's work, and have any doubtful species checked by Dr Dony. Several interesting plants were found, and the final results were most satisfactory. It is hoped that the work of recording for the Flora will be completed next season.—M. P. YULE.

IRELAND

MAYO AND GALWAY. 14TH-20TH APRIL

Several members of the B.S.B.I. enquired about the Heather Society's meeting in the West of Ireland in April, and some eventually joined. It was a friendly and successful gathering of a score of people, with much variety. Indeed on two days most participants did not even see the 'heather-with-no-valid-specific-name' (*E.* '*mediterranea*'), but they still thoroughly enjoyed themselves. One of these occasions was a trip to Clare Island (where a *Gunnera* was seeding itself in two places). There, two members, with local assistance, found the right cliff for the heather, about one mile north of the harbour, a locality which could easily be overlooked although it extends for 200-300 yards. Here too were *Epilobium nerterioides* and the Lusitanian Marsh Dandelion, *Taraxacum lainzii* van Soest (det. A. J. Richards). In addition some common plants, which chanced to be noted, proved to be unrecorded for the island. Glenamoy Peatland Research Station was visited and much of value learnt from Mr P. O'Hare, the Manager, on shelter belts, strains of conifers, peat, drainage, crops of all sorts, pastureland, bees, grouse, and weather. Local friends kindly entertained many of the party to tea on most days, and Rosturk Castle, where there were thickets of *Rubus spectabilis*, proved an ideal base. Nearly all the areas for the above heather were visited, as a result of which three alterations could be made to squares in the *Atlas of the British Flora*. A full report will appear in the *Irish Naturalists' Journal* and briefer ones appeared in the *Wild Flower Magazine* for Sept. 1968, and the *Bulletin and 1968 Year Book of the Heather Society*.—D. MCCLINTOCK.

CAVAN. 12TH-18TH JULY

This Meeting was outstanding for the number of *Carex* species seen—twenty-nine in all—of which the most notable were *C. elongata*, *C. aquatilis* and *C. strigosa*. Jermy & Tutin's new book on *British Sedges* was very much in evidence! Unusual hybrids seen during the Meeting were × *Festulolium loliaceum*, *Juncus* × *diffusus* and *Salix* × *decipiens*. Cornasuas Mountain near Bailieborough yielded *Lycopodium clavatum* and *Listera cordata*, while on Bruce Hill *Thelypteris limbosperma* and *T. phegopteris* were seen. An interesting assemblage of species, including both the male and female plants of *Salix pentandra*, was found in a marsh near Ballyconnell. *Thymus pulegioides*, recorded by R. Ll. Praeger near Mount Nugent, was sought for in vain. Some quarries were also visited and finds included *Coeloglossum viride* and *Cystopteris fragilis*.—Leader: Miss A. C. M. FOLAN.

NORTH TIPPERARY. 18TH-24TH JULY

With the aim of assisting the Leader in his Flora of North Tipperary, most of those who had attended the Cavan Meeting travelled southwestwards and were joined by other members. A great deal of recording was done resulting in a minimum of 175 species in any one square and over 300 in some. A total of 590 species were recorded during this Meeting. The wide range of habitats included marshy meadows, bogs, gravel ridges, lakeshores, turloughs and bogs. *Orobanche hederae* and *O. minor* were seen near the Little Brosna River. Among the other interesting species seen were *Teucrium scordium*, *Campanula trachelium*, *Hydrocharis morsus-ranae* and *Rumex maritimus*. —Leader: R. McMullan.

BOYNE VALLEY. 17TH AUGUST

Our first one-day meeting was held in the picturesque Boyne Valley, County Meath. Twenty-two people attended—from Galway, Wexford, the Dublin Region and Northern Ireland. The first stop was made at the Commons in Duleek, where the Leader's County Records of *Carex dioica*, *C. hostiana* and *Eriophorum latifolium* were seen. During the afternoon we walked along the river bank at Staleen and found *Glyceria maxima* and × *Festulolium*. At Rosnaree, we saw *Butomus umbellatus*, *Bidens tripartitus* and *Hordeum secalinum*. The Leader showed us *Juncus compressus* in the Rosnaree area, which he had recorded as new to Ireland in a preliminary walk before this Meeting. It was later found again near Slane.—Leader: D. Synnott.

SCOTLAND

THE AVON AND CANDER VALLEYS, STONEHOUSE. 1ST JUNE

The party met at Stonehouse but due to inclement weather decided to spend the morning in relative shelter by visiting Craignethan Castle. A brief inspection of the banks of the Avon at Glassford Bridge produced *Montia sibirica*, *Asperula odorata* and *Crepis paludosa*. *Peucedanum ostruthium* and *Clinopodium vulgare* were found growing on the roadside near Stonehouse, and nearby on a south-facing bank *Leonurus cardiaca* and *Malva moschata*. *Sedum reflexum*, *Cheiranthus cheirii*, *Asplenium adiantum-nigrum*, *Veronica hederifolia* and *Chelidonium majus* grew on the Castle walls while below were *Arum maculatum* and *Origanum vulgare*. On the journey back *Cardaria draba* was seen on the stonework of Cander Mill.

In the afternoon the party was joined by members of the Hamilton Natural History Society. On the way to the Avon valley a colony of *Galium mollugo* was seen and *Petasites hybridus* was found in abundance. The woods bordering the Avon are very mixed with Blackthorn, Sycamore, Hawthorn, Ash, Oak, Wych Elm, Rowan, Hazel, Gean and Bird Cherry. Willows abound and hybrids of *Salix caprea*, *S. viminalis*, *S. purpurea* and *S. fragilis* were noted on the river banks together with fairly pure *S. pentandra*. Under the fairly light canopy there is a varied ground flora including *Veronica chamaedrys*, *Lysimachia nemorum*, *Glechoma hederacea*, *Moehringia trinervia* and *Melica uniflora*, while by the river *Campanula latifolia*, *Ranunculus auricomus* and *Saxifraga granulata* were frequent.

The woodland path eventually led into a large meadow bounded by a loop of the river. Here *Geranium pratense*, *Polygonum bistorta*, *Barbarea vulgaris* and *Montia sibirica* were seen along the river bank and a colony of double-flowered *Saxifraga granulata* has persisted here for many years. An unsuccessful search was made for *Trollius europaeus* which formerly grew here.—Leader: S. W. Birnage.

BEN VRACKIE, PERTHSHIRE. 22ND JUNE (JUNIOR MEETING)

On a fine day, a party of nine members ascended one of the most interesting hills in eastern Perthshire. On this occasion, the party was associated with the Alpine section of the Botanical Society of Edinburgh, led by Mr J. Grant Roger, bringing the total number present to thirty-seven.

The complex geology of Ben Vrackie is reflected in the richness and variety of its flora. We were able to see many interesting plants of woodlands, heather moorland, base-rich flushes, screes, boggy pools and the exposed summit ridge, as well as the famous plants of the cliffs just below the summit.

A most enjoyable feature of the day was the happy co-operation between the two parties present.—BRIAN S. BROOKES.

UPPER NITHSDALE. 29TH-30TH JUNE

A party of eight from the B.S.B.I. and Dumfriesshire and Stewartry Branch of the Scottish Wildlife Trust met north of Sanquhar on June 29th and examined five hill ravines cutting through different geological strata as follows:-

1. Grain Burn, Bail Hill (26/71-v.c.72) Ordovician volcanics. Acid-type flora with a few basic bryophytes.
2. Penbreck Burn (26/71-v.c.75) Carboniferous Limestone. *Sedum villosum* flowering profusely; *Asplenium viride*, *Cystopteris fragilis*, *Melica nutans* and *Rubus saxatilis* also noted.
3. March Burn (26/71-v.c.75) Lower Old Red Sandstone succeeded by a volcanic ash. *Saxifraga hypnoides* and *Galium sterneri* noted.
4. Connor Hill (26/71-v.c.75) Basic Lava of Lower Old Red Sandstone age. *Rosa pimpinellifolia* and *Carex lepidocarpa* were recorded.
5. Polwhannan Burn (26/72-v.c.75) Cornstone belt of Upper Old Red Sandstone. *Asplenium viride*, *Botrychium lunaria* and young *Eriophorum latifolium*, in a flushed area above the burn were seen.

The natural woodland clothing the sides of the ravines cut by the tributaries of the Nith in their lower reaches was the second day's theme. Characteristically the underlying rock of these ravines is Ordovician greywacke but the Euchan Water flows through sandstone of faulted Upper Carboniferous strata for part of its course.

In the morning Holm Woods, Crawick Glen (26/71-v.c.72) were visited. Abundant *Equisetum pratense*, generally near the waterside, with sheets of *E. sylvaticum* above, and *Carex laevigata* and *C. remota* were recorded.

In the afternoon Euchan Water (26/70-v.c.72) was visited. *Vicia orobus* and typical *Salix phylicifolia* were seen.

After this some of the party dispersed but four members continued. Chapel Hill (26/71-v.c.72): *Meum* and *Leucorchis* along with *Gymnadenia conopsea* and *Salix repens* in grassland above scrub were noted. Mennock Water (26/80-v.c.72): *Festuca altissima* was seen in the gorge. *Vicia orobus*, and single plants of *Coeloglossum*, *Leucorchis* and *Platanthera bifolia* were noted on a steep grassy bank above the ravine.

The weather for the meeting was cool, but not very wet, and the plants seen generally typified this part of Scotland.—H. MILNE-REDHEAD.

ISLE OF TIREE. 3RD-10TH JULY

Visiting Tiree (like Coll) is following in Heslop-Harrison's footsteps (*Proc. Univ. of Durham phil. Soc.*, **10**, 4, (1941)), with this difference, that Heslop-Harrison and his party appear to have paid much less attention to Tiree, admittedly a less attractive island botanically than Coll. (The rock is the same, Lewisian gniess, but the silver sands seem less calcareous.) Macvicar's work, 'On the Flora of Tiree' (*Ann. Scot. nat. Hist.* no. 25, Jan. 1898, and no. 26, April 1898), should also not be overlooked as it contains much information that is not referred to by Heslop-Harrison.

Our own party of eight might have covered more ground if transport had not been limited to one car, but as the island is contained (except for one very small area) in two 10 km grid squares we were able to do reasonable justice to both as far as mapping was concerned, and also to add three species to the flora of v.c.103, and more than a dozen to the flora of Tiree.

On the afternoon of our arrival on July 3rd, which was our only wet day in a week of wonderful weather, 130 species were found in a mile by the roadside and seashore between Heanish and Baugh (17/04), with *Calystegia soldanella*, first reported from the island by Macvicar but not seen there by Heslop-Harrison, and *Polygonum oxyspermum* (probably subsp. *raii*), as our most interesting finds. The following day we proceeded to Balephetrish Bay and the coast immediately to the north-east of it (17/04), where a small area of limestone is indicated on the geological map. No limestone was seen, however, though the alkalinity of the soil was shown by the abundance of *Schoenus nigricans*. In small pools near the coast we saw *Potamogeton filiformis* and *P. gramineus*. *Lycium barbarum*†, probably originally planted, was one of the few aliens seen on an island where there are few gardens for them to escape from. An oat found on the dunes may be *Avena strigosa*†, but the specimen collected has not yet been checked.

On July 5th some of the party climbed Carnan Mòr (460 ft) while others went to Loch Gàrradh a' Chapuill (both in 07/94). Both were disappointing, though useful for starting a record-card from scratch, nothing more interesting being seen in the loch than *Potamogeton natans*, *P. polygonifolius* and *Sparganium angustifolium*. However, quite a large colony of a mint in a flourishing state on the village green in Balemartine was probably a form of *Mentha* × *niliaca*† which had been planted there. A field gay with weeds by the village had nothing new for us but *Anthemis cotula*†, *Brassica rapa*† and *Galeopsis tetrahit*†. At Heylipoll (07/94), where we went on July 6th, most of us enjoyed seeing a marsh with plenty of *Drosera intermedia* and *Hypericum elodes*, and a small quantity of *Listera ovata*, *Pinguicula lusitanica* and *Utricularia intermedia*. (*Drosera anglica* does not seem to occur in Tiree, so it was useless to look for *D.* × *obovata*). *Dactylorhiza fuchsii* was common, but throughout the week we were unable to find a single plant of *Gymnadenia conopsea*, nor has it apparently been recorded. In an unnamed loch near by we saw *Lobelia dortmanna* and *Potamogeton gramineus*, but disappointingly no *Isoetes*, another genus that eluded us, though *Isoetes setacea* was seen by us more than once last year in Coll. *Inula helenium* and *Salix viminalis*†, found by the roadside in this area, were probably originally planted. *Epilobium hirsutum*† near a farm was a pleasant surprise, as this species is rare in the Western Isles. The find of the day came when we returned to our lodgings and the proprietor of the guest-house at Baugh (17/04) presented us with a single plant of *Papaver hybridum** from his potato patch, evidently introduced with carrots the previous year. *Sisymbrium orientale*† was also found as a weed in his garden.

The next day (July 7th), somewhat intimidated by the solemnity of the island Sabbath, we crept out to explore Gott Bay, to find absolutely nothing of interest except *Catabrosa aquatica* subsp. *uniflora* creeping in sand at about high-water mark. Others of the party went further east to the Caoles area where our only orchid hybrid of the week, *Dactylorhiza purpurella* × *maculata* subsp. *ericetorum*, was seen in a wet meadow, and *Salicornia europaea* was noted on the sea-shore.

On July 8th we decided to return to the base-rich Balephetrish area (17/04), where a number of shallow lochs (Loch Riaghain, Cnu Lochanan, etc.) gave us *Lysimachia nummularia*, *Hammarbya paludosa*†, *Juncus balticus*, *Potamogeton coloratus*, *P.* × *nitens* and *P. rutilus** at Loch an Eilein. Our last day (July 9th) was given up to The Reef, an area of machair partly occupied by an airfield. *Anacamptis pyramidalis* and *Draba incana* were found in very small quantity. Disappointed by the machair, we returned to Loch a' Phuill (07/94), where the *Potamogeton* enthusiast refound Heslop-Harrison's *Potamogeton* × *suecicus*, while the rest of the party noted *Gnaphalium uliginosum* and *Platanthera bifolia*.

The main interest of the week was in assessing the differences in the floras of Coll and Tiree. In Tiree ferns were scarce, *Hieracia* apparently absent, and even *Digitalis* seems to have disappeared from its only locality. In the above account an asterisk indicates a record new to v.c.103, and a dagger a plant believed to be new to Tiree.

—URSULA K. DUNCAN.

ISLE OF MULL. 13TH-20TH JULY

The party assembled on Saturday, 13th July, at Tobermory. Sunday was spent on the road between Dervaig and Salen visiting saltmarsh, moorland and rocky gorge, the last named proving the most interesting. *Huperzia selago* about 50 feet above sea level was interesting.

On Monday a visit was paid to the Gribun. Four members made this sunny day the occasion for a swift visit to Iona.

Tuesday was set aside for Mull's second highest hill, Dun da Ghaoithe. Scallastle Glen was scoured but only one member reached the higher parts which proved extremely interesting with *Silene acaulis* and *Cherleria sedoides* in abundance.

On Wednesday most of the party went by boat to Mingarry bay which is not easily approached by land. *Vicia orobus* was the most interesting find. Three of the party visited Ben More instead and enjoyed its mountain vegetation.

On Thursday Torloisk on Loch Tuath was visited and here scrub hazel and oak, etc. sheltered an interesting flora. We failed to find *Mertensia maritima* on the seashore though it has been recorded here but *Hypericum humifusum* (rare in Mull) was found.

Friday was spent by Loch Ba except for three members who walked up one glen and down Glen Connal to rejoin the party at Loch Ba. Loch Ba plunges to great depths but at Glen Clachaig there are sand and gravel flats and in six inches of water five of the party came upon *Subularia aquatica* and *Elatine hexandra.*

Most of the party caught ferries early on Saturday but a few stayed on and re-visited Dun da Ghaoithe adding *Saussurea alpina* and others to the list.

Altogether this nine-strong party had an interesting week in Mull and it is hoped that the results will prove of value to the British Museum for its Mull project.

—A. SLACK.

GOSFORD BAY, EAST LOTHIAN. 20TH JULY

A party of ten explored this coastal area under somewhat wet conditions. *Geranium sanguineum* was widespread, with several brilliant patches. The two roses common here were *Rosa pimpinellifolia* and *R. rubiginosa.* Numerous cowslips seen in flower in May were now in fruit.

A colony of *Chrysanthemum balsamitica* (first seen in 1959) was still flourishing amongst tall grasses which it now appears to be dominating. *Potentilla tabernaemontani* was spreading and *Sieglingia decumbens* was recorded for the first time. *Geranium endressii* × *versicolor* provided a beautiful display of colour and the colony of the hybrid mint, *Mentha* × *niliaca*, was doing well.

Coastal plants were numerous including *Armeria maritima*, *Cakile maritima*, *Aster tripolium*, *Elymus arenarius*, *Ammophila arenaria*, and *Agropyron junceiforme* etc. Abundant yellow composites included *Leontodon hispidus*, *L. taraxacoides*, *Hypochoeris radicata*, and three species of *Sonchus*. A small group of wind-bent trees included *Quercus petraea*, *Salix cinerea* subsp. *oleifolia*, and *Betula pendula*. Two copses of *Hippophae rhamnoides* also flourished. The newest discovery was *Polygonum oxyspermum* recently reported from several east coast localities.—J. MILNE.

COBBINSHAW RESERVOIR, MIDLOTHIAN. 3RD AUGUST

On a lovely hot August morning, a party of ten led by Dr P. Myerscouth met at Cobbinshaw Station.

Cobbinshaw Reservoir or Loch is owned by British Railways. It is a large somewhat featureless sheet of water about two miles long and half a mile wide. It is divided into two parts by a road, and it was the very much smaller area to the south-west which proved to be the most rewarding. On previous visits, its more interesting plants were found in very small quantity or not at all because so much of the ground was deep bog. Nor had it previously been possible to explore the shore from the loch side. Owing to the extremely dry season this summer, a considerable margin of the loch was exposed. Most of this almost dry margin was covered with a dense sward of *Littorella uniflora* in flower. On the landward side, to our great surprise, there was colony after colony of *Naumbergia thyrsiflora*. This plant occurs in great abundance in the Union Canal, particularly in the East Stirlingshire section, originating from its feeder, Cobbinshaw Loch. Along with the *Naumbergia* there were colonies of *Lycopus europaeus* and *Scutellaria galericulata*. Some bays were covered with *Polygonum amphibium*, *Menyanthes trifoliata*, *Potentilla palustris*, *Carex rostrata* and *Elodea canadensis*. There was a fine stand of *Scirpus lacustris* and there were several colonies of *Viola palustris*.

On the boggy moorland along with *Erica tetralix*, *Pedicularis sylvatica*, *Narthecium ossifragum* and *Drosera rotundifolia* in flower, *Oxycoccus palustris* was found, in considerable quantity, in fruit.—E. P. BEATTIE.

PERSONALIA AND NOTICES TO MEMBERS

THE NATURE CONSERVANCY BIOLOGICAL RECORDS CENTRE

All correspondence about the Distribution Maps Scheme should now be addressed to Dr F. H. Perring, Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntingdon.

The Centre will welcome records of the distribution of British vascular plants: these will be stored with the intention of producing a second edition of the *Atlas of the British Flora* about 1985. In the meantime, copies of up-to-date maps can be prepared and supplied to research workers at 2s. 6d. per copy.

Other items which are available from Dr Perring (address as above) include:

1. 35 mm filmstrips. 100 selected pairs of maps from the *Atlas*, price £2 per set.
2. Regional Record Cards and 'Trust' Record Cards with numbers substituted by columns. Both at 15/- per hundred.
3. Individual Record Cards, price 10/- per thousand.
4. Base maps of the British Isles with 100 km grid (quarto) and also of Ireland, and Scotland. Price 2d. each.
5. Corrections to the *Atlas of the British Flora* free on receipt of a stamped addressed envelope.
6. Record cards and instructions for the *Symphytum* survey. Free.

The Centre would like to build up a collection of recording cards: if you have one designed would you please send us a copy?

The Centre would be most grateful for the gift of any out-of-date copies of Bartholomew's 'Gazetteer of Great Britain'—age immaterial.

From time to time there may be vacancies at the Centre for Secretaries or Clerical Assistants. All the work is connected directly or indirectly with Plant and Animal recording which might interest an amateur naturalist with professional secretarial skills. Typing and experience of running an office essential, but there is a dictaphone. If any member is interested, then he or she should write to Dr Franklyn Perring, at Monks Wood Experimental Station, Huntingdon.

ARCHIVES OF THE SOCIETY

It has been decided by Council that the Society should collect together pamphlets, photographs and other material relevant to its history and organization. Any member who possesses items which may be of interest in this connection is asked to contact the Hon. Archivist, Botanical Society of the British Isles, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

BACK NUMBERS OF *WATSONIA* AND *PROCEEDINGS*

Part of the Society's revenue is obtained from the sale of sets of *Watsonia* and *Proceedings* to booksellers and libraries.

Unfortunately, certain parts are now in short supply and it will soon become difficult to prepare complete 'runs'. The numbers concerned are *Watsonia*, Vol. 2, Parts 5 and 6, Vol. 3, Parts 5 and 6, Vol. 4, Part 1, and Vol. 5, Part 5 and *Proceedings*, Vol. 2, Part 4, and Vol. 5, Part 1. Members who have any of these parts which they no longer require are invited to assist the Society by sending them to E. B. Bangerter, c/o Dept. of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

CONSERVATION COMMITTEE NOTICES

Information on threats to the British Flora should be communicated to the secretary of the Conservation Committee of the B.S.B.I., Dr A. J. Richards, The Botany School, South Parks Road, Oxford. Such threats include the possible damage or extinction of rare or local species in a habitat, and interference with interesting habitats. In the case of damage through the use of toxic herbicide sprays, a form listing the information required by the Nature Conservancy to act on such reports will be forwarded. In all cases, the name and address of the land-owner, and a detailed account of the nature of the damage is of the greatest assistance.

An increasing number of attempts to introduce species into habitats in which they are not at present found has made it very necessary that a record be kept of all such experiments. Dr F. H. Perring, The Biological Records Centre, Monks Wood Experimental Station, Abbots Ripton, Huntington, would like to be advised of such attempts, and will send a short list of the information needed to satisfactorily record these experiments on request.

THE BRITISH MUSEUM MULL PROJECT

The Department of Botany of the British Museum (Natural History) is engaged in a field programme in which a floristic and descriptive ecological survey of the Island of Mull and its adjacent small islands (v.c. 103, Mid Ebudes in part) will be completed over a five-year period. It is envisaged that the work will culminate in the production of a publication of the 'County Flora' type.

Since, unlike the authors of most county Floras, the department is equipped with staff, collections and library to deal, at least in theory, with all groups of plants, it is hoped that the final publication will be of unusually wide taxonomic coverage, and will make a special feature of the ecological and geographical relationships of the flora.

It will be evident to those experienced in work of this kind, that this is an ambitious programme and represents a substantial commitment of the department's time and resources. For this reason offers of help from interested persons are very welcome. We have been very fortunate in gaining the active support and assistance of a number of botanists from both Scotland and England, who have done much to supplement our own observations. Although twenty-four members of our own staff have already been involved in field-work in Mull, totalling over sixty man-weeks in the field, we are well aware that considerations of distance and time mean that our work can be greatly enriched through the help of others, which will of course receive appropriate recognition in the proposed final publication.

If you can help or would like any further information, please write in the first instance to J. F. M. Cannon or E. B. Bangerter, Department of Botany, British Museum (Natural History), Cromwell Road, London, S.W.7.

TARAXACUM

Dr A. J. Richards, The Botany School, South Parks Road, Oxford is working on the taxonomy and distribution of British *Taraxaca*. Herbarium specimens, if possible with ripe seeds, would be gratefully received. Annotations on posture of the exterior bracts, colour of the style and stigma (pure yellow or discolored), presence or absence of pollen, and the presence of colour on the petiole and median nerve of the leaf are of great assistance. Devon, Cornwall, The Wye Valley, The Hebrides, and Ireland are particularly underworked in this genus, and material from these areas would be of great interest. *Vulgaria* (*T. officinale*) should not be collected after May 31st.

FOLKESTONE NATURAL HISTORY SOCIETY

The Society celebrated its 100th Anniversary in March, 1968 and to mark the occasion a Centenary Publication has been produced with contributions by members and others intimately connected with natural history in Folkestone. The Centenary Publication is priced at £1-0-0 (15/- to members of Folkestone Natural History Society) and is obtainable from the Hon. Secretary, Miss V. Day, N.D.H., F.R.H.S., 18 Wear Bay Crescent, Folkestone.

FLORA OF LEICESTERSHIRE

An autonomous committee has been formed to begin work on the preparation of a new County Flora of Leicestershire. Any offers of help in recording on a 4 square kilometre 'tetrad' basis would be greatly appreciated, and also any existing records. Communications should be addressed to the Hon. Secretary of the Leicestershire Flora Committee:

Rev. A. L. Primavesi, Ratcliffe College, Syston, Leicester, LE7 8SG.

FLORA OF V.C.104 N. EBUDES

Owing to unforeseen circumstances, R. I. Sworder much regrets that he is unable to continue with this project. Anyone who may be interested in this area is asked to get in touch with Mrs C. W. Murray, Prabost, Skeabost Bridge, Portree, Isle of Skye, who is preparing a Flora of the same area but excluding The Small Isles.

BRITISH LICHEN SOCIETY DISTRIBUTION MAPS SCHEME

Members wishing to help the British Lichen Society with their mapping scheme based on the 10 km grid square system are asked to contact the Mapping Recorder, M. R. D. Seaward, Biology Dept., Loughborough College of Education, Loughborough, Leicestershire.

VERONICA SECTION *BECCABUNGAE*

N. G. Marchant, Botany School, Downing Street, Cambridge, is investigating variation in the species of *Veronica* section *Beccabungae*, and would be grateful for herbarium specimens and, if possible, seeds of these species.

ANNUAL SPECIES OF *SILENE*

Mrs E. Bari, Botany School, Downing Street, Cambridge, would be grateful for samples of wild-collected ripe seed of annual species of *Silene* from Britain or the Continent. Recently collected, unpoisoned herbarium material would be most welcome if a ripe sample could be extracted.

SCIRPUS

Dr J. K. Spearing of the Department of Botany and Zoology, Sir John Cass College, Jewry Street, London, E.C.3, is anxious to obtain viable seeds from reliably determined species of *Scirpus* (*sensu lato*), or alternatively fresh specimens with roots attached, for a comparative study of root anatomy of this genus. Notes on the provenance of specimens would be appreciated. Postage and packing costs will be refunded.

PROPOSED PREDANNACK NATURE RESERVE, THE LIZARD, CORNWALL

The Cornwall Naturalists' Trust is appealing for £4,000 to secure a long lease on about 250 acres to be included in the proposed Predannack Nature Reserve which will be managed by the Trust.

The Reserve will include the Lower Predannack Downs, Lower Predannack Cliffs (The Morrops), Kynance Cliffs, Mullion Island and three headlands between Mullion Cove and Predannack Cliffs. The whole area is of considerable botanical and geological interest.

Those interested in conserving the area should send donations to the Hon. Secretary (Predannack Nature Reserve Fund), Lt.-Col. W. E. Almond, Laverock House, St. Breward, Bodmin, Cornwall.

RANUNCULUS BULBOSUS AND *R. REPENS*

Dr S. M. Coles, Biology Department, Keele University, Staffordshire, would be grateful for material of *Ranunculus bulbosus* agg. and *R. repens*; either in the form of ripe seeds or living plants, from abroad and from the remoter parts of the British Isles. Postage will be refunded.

CHANGES TO THE LIST OF RECORDERS

The following changes have taken place since May, 1967:

V.c. 42 Brecon M. Porter (replacing R. G. Ellis).
V.c. 55 Leicester Rev. A. L. Primavesi (replacing Prof. T. G. Tutin).
V.c. 61 S-E. York Miss E. Crackles (replacing Dr W. A. Sledge).
V.c. 80 Roxburgh R. W. M. Corner (replacing Dr H. Milne-Redhead).
V.c. H. 10 N. Tipperary R. McMullen (replacing Prof. D. A. Webb).

CHANGES TO THE PANEL OF REFEREES AND SPECIALISTS

The following changes should be made to the list published in May, 1967 (*Proc. bot. Soc. Br. Isl.*, **6**, 433–8).

Dryopteris filix-mas agg.: add H. Corley
Ulex: add P. M. Benoit.
Quercus: delete G. A. Matthews, add J. E. Cousens.
Populus: add J. Jobling, Forestry Commission, Forest Research Station, Alice Holt Lodge, Wrecclesham, Farnham, Surrey.
Symphytum: add Dr G. A. Nelson, and Dr F. H. Perring.
Myosotis: add D. Welch.
Verbascum: delete D. P. Philcox, add I. K. Ferguson (K).
Add *Mimulus*: R. H. Roberts.
Galeopsis tetrahit agg.: Add P. M. Benoit.
Filago: delete D. P. Philcox, add J. E. Lousley.
Gnaphalium: delete D. P. Philcox, add J. E. Lousley.
Aster: delete D. P. Philcox, add P. F. Yeo.
Erigeron: delete D. P. Philcox (position now vacant).
Taraxacum: delete A. C. Jermy, add Dr A. J. Richards.
Add *Juncus bulbosus s.l.*: P. M. Benoit.

ORCHIDACEAE: delete V. S. Summerhayes, add P. F. Hunt (K).
Dactylorhiza: delete V. S. Summerhayes, add R. H. Roberts.
Carex: add Miss S. S. Hooper (K).

MISCELLANEOUS SUBJECTS

Add Climate in relation to Plant Distribution: Dr J. P. Savidge.
Add Infraspecific Taxa of British Phanerogams (references to descriptions and cultivation experiments): D. E. Allen.
Systematic Works and Monographs: delete C. C. Townsend, add D. H. Kent.

ADVERTISEMENTS

A limited number of relevant advertisements will be accepted for the Society's publications as space permits. Enquiries should be addressed to D. H. Kent, 75 Adelaide Road, London, W.13.

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Contents

DONY, J. G. Additional Notes on the Flora of Bedfordshire 523–535

HAWKSWORTH, D. L. Notes on the Flora and Vegetation of Foula, Zetland (v.c.112) 537–547

OCKENDON, D. J., WALTERS, S. M. & WHIFFEN, T. P. Variation within *Centaurea nigra* L. 549–552

NETWORK RESEARCH 553–559

PLANT NOTES 561–562

PLANT RECORDS. Compiled by E. C. WALLACE 563–566

ABSTRACTS FROM LITERATURE. Compiled by D. H. KENT 567–614

LOCAL FLORAS CURRENTLY AVAILABLE FOR SALE. Compiled by FRANKLYN PERRING 615–617

BOOK REVIEWS 619–622

OBITUARIES 623–625

REPORTS

- Welsh Region Report for 1967–1968 627
- South-West Regional Meeting, 1968 628
- Field Meeting, 1968 629–639

PERSONALIA AND NOTICES TO MEMBERS 641–645

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INDEX

Aberlady Bay (Field Meeting 1967), 298
Abstracts from Literature (compiled by D. H. Kent), 33–64, 201–290, 401–494, 567–614
Aconitum anglicum, 506
Additional notes on the flora of Bedfordshire (by J. G. Dony), 523–535
Advertisements (notice for), 645
Agropyron (identification of species of), 76
Aiton, W. (1731–1793), 11
Alchemilla alpina, 83
Alchemilla faeroensis (Lange) Buser and *A. alpina* L. (by S. M. Walters and V. G. Boznan), 83
Alchemilla glomerulans Buser—in southern Scotland (by R. W. M. Corner), 561
Allen, D. E.—Illustrations of early vascula, 71–72
Allen, D. E.—*Neotinea intacta* (Link) Reichb. f. in the Isle of Man, 165–168
Allen, D. E.—Plant notes: *Lysimachia vulgaris*—in the Isle of Man, 390–391
Allen, D. E. (joint author with Benoit, P.M.)—Synthesised *Juncus bulbosus* × *kochii*, 504
Allen, D. E. (joint author with Dony, J. G.)—Report of the Council for 1967, 497–499
Altitude (effects of), 508
Anacamptis pyramidalis (in Isle of Man), 167
Anaphalis margaritacea (keyed out), 16
Anatomical structure of aquatic monocotyledons (by M. Y. Stant), 513
Annual General Meeting, 29th April, 1967 (by D. E. A. and J. F. H.), 293–295
Annual species of *Silene* (by E. A. Bari) (report of exhibit), 72
Annual species of *Silene* (appeal for material), 103, 308, 519, 643
Antennaria dioica (keyed out), 16
Archives of the Society (notice of), 101, 305, 517, 641
Arctous alpinus (on Foula), 545
Ardnamurchan (*Eriocaulon aquaticum* in), 509
Arenaria (cytology and phytochemistry), 512
Arenaria cucubaloides, 512; *dianthoides*, 512; *procera*, 512
Argyll (Field Meeting 1967), 301
Arizona (some plants from), 84
Arran, plants of, 512–513
Arriundle Forest Nature Reserve, 187
Arundinacea disticha, 510; *japonica*, 510
Asparagus officinalis (keyed out), 17
Asplenium billotii × *Phyllitis scolopendrium*, 387–389
× *Asplenophyllitis microdon*, 387–389
Aster macrophyllus L. and *A. schreberi* Nees (by D. McClintock), 510
Aster schreberi, 510
Avon and Cander Valleys, Stonehouse (Field Meetings 1968), 635
Back numbers of *Watsonia* and *Proceedings* (notice), 101, 305, 517, 641–642
Backwell County Secondary School, Bristol—Plant notes: *Buxus sempervirens* L. in Bourton Combe Gorge, Somerset, 389–390
Ballantyne, G. H.—Field Meetings 1967: Dumbarnie Links, 299
Bamboo seed (by D. McClintock), 510
Bangerter, E. B.—Report of the Council for 1966, 85–87
Bangerter, E. B. (joint author with Cannon, J. F. M.)—Plant records from Mull and the adjacent small islands, 365–372
Bari, E. A.—The annual species of *Silene* (note on exhibit only), 72
Bari, E. (appeal for annual species of *Silene*), 103, 308, 519, 643

Beattie, E. P.—Committee for the Study of the Scottish Flora: twelfth annual report to 31st December 1966, 90–91

Beattie, E. P.—Committee for the Study of the Scottish Flora: thirteenth annual report to 31st December 1967, 502–503

Beattie, E. P.—Field Meetings 1967: Aberlady Bay, 298

Beattie, E. P.—Field Meetings 1967: Carribber Glen, 298

Beattie, E. P.—Field Meetings 1967: Ferry Hills, Fife, 301

Beattie, E. P.—Field Meetings 1967: Lammermuir Deans, 300, 302

Beattie, E. P.—Field Meetings 1967: Tynninghame Bay, Dunbar, East Lothian, 302

Beattie, E. P.—Field meetings 1968: Cobbinshaw Reservoir, Midlothian, 638–639

Bedfordshire (additional notes on flora), 523–535

Ben Vrackie, Perthshire (Field meetings 1968), 635–636

Benoit, P. M. and Allen, D. E.—Synthesised *Juncus bulbosus* × *kochii*, 504

Berkshire, Flora of (notice of exhibit only), 504

Betula L. in Britain (by S. M. Walters), 179–180

Betula humilis, 180; *japonica*, 179; *nana*, 179; *papyrifera*, 179; *pendula*, 179, 181; *pubescens*, 179–180, 181

Beynes, Th. P. and Lancaster, C. R.—The English Box (*Buxus sempervirens*) and its forms (notice of exhibit only), 504

Billinge Hill, v.c. 58 (*Rumex longifolius*), 561

Birnage, S. W.—Field meetings 1968: Avon and Cander Valleys, Stonehouse, 635

Books reviews, 65–66, 619–622

Botanical paintings and stamp designs (by B. Everard) (notice of exhibit only), 506

Botanical survey of Mull (by J. F. M. Cannon), 72

Boulos, L. [T. sphalm.]—Personalities at the Liverpool Conference (notice of exhibit only), 504

Bourton Combe Gorge, Somerset (*Buxus sempervirens*), 389–390

Bowen, H. J. M.—*Centaurium portense* in Ireland, 505

Bowen, H. J. M.—Field Meeting 1968: Virginia Water, 632

Bowen, H. J. M.—Flora of Berkshire (notice of exhibit only), 504

Boyd Watt, W. (obituary by B. M. C. Morgan), 624–625

Boyle, P. J.—*Spartina pectinata* Link in Ireland, 505

Boyne Valley (Field meeting 1968), 635

Boznan, V. G. (joint author with S. M. Walters) — *Alchemilla faeroensis* (Lange) Buser and *A. alpina* L., 83

Briggs, M.—North-East Regional Meeting, York, 1967, 503

Britain's endemic flowering plants (by J. L. Gilbert), 506

British Herbarium of flowering plants and ferns at the City of Liverpool Museums (by E. F. Greenwood), 169–172

British Lichen Society Distribution Maps Scheme, 307, 519, 643

British Museum Mull project, 102–103, 306–307, 518, 642

British Sedges, by A. C. Jermy and T. G. Tutin (reviewed by C. A. Sinker), 620–621

Bromus (section *Ceratochloa*)—in Britain (by A. Melderis), 392–393

Bromus carinatus, 392; *catharticus*, 392; *marginatus*, 392; *willdenowii*, 392

Brookes, B. S.—Field Meeting 1968: Ben Vrackie, Perthshire, 635–636

Brummitt, R. K.—Three species of *Sigesbeckia* in Britain, 19–21

Bryonia cretica (keyed out), 16

Buckinghamshire (Flora of; notice of exhibit only), 78

Buddleja davidii (on industrial waste), 296

Burns, A.—Field Meeting 1967: Goss Moor, Cornwall, 297

Bury St. Edmunds (Field meeting 1968), 632

Butomus umbellatus (anatomy of), 513

Buxus sempervirens (notice of exhibit only), 504

Buxus sempervirens L. — in Bourton Combe Gorge, Somerset, 389–390

Cadbury, C. J. — Field meetings: Switzerland and Italy, 629–631

Calamagrostis scotica, 506

Calluna vulgaris var. *hirsuta*, 542

Calystegia pulchra (taxonomic position), 352; *sepium s.l.*, 352; *sepium* (in London area), 79; *silvatica* (in London area), 79
Camlyn Oakwood, 185, 187
Campion enquiry (by J. P. Savidge), 557–559
Cannon, J. F. M.—A botanical survey of Mull, 72
Cannon, J. F. M. and Bangerter, E. B.—Plant records from Mull and the adjacent small islands, 365–372
Carex (review) 620–621
Carex section *Acutae* (by A. C. Jermy), 77
Carex appropinquata Schumach.—in Scotland (by R. W. M. Corner), 562
Carex diandra, 511; *grahamii*, 77; *rostrata*, 77; *saxatilis*, 77; *saxatilis* var. *dichroa*, 77
Carex stenolepis—a problem sedge (by A. C. Jermy), 77
Carex vesicaria, 77
Carriber Glen (Field meeting 1967), 298
Caryophyllaceae (brief notice of stereophotographs of), 76
Cavan (Field meeting 1968), 634
Centaurea nigra (notice of exhibit only), 511
Centaurea nigra (variation in), 549–552; *nigra* subsp. *nemoralis*, 549–552
Centaurium portense in Ireland (by H. J. M. Bowen), 505
Central Wales (Flora of; notice of exhibit only), 83
Ceratochloa haenkeana, 392; *unioloides*, 392
Chalk grassland, 102, 306
Chamaepericlymenum suecicum, 542
Cheshire (A Contemporary Flora of), 81
Chilterns (Field meeting 1967), 297
Chrysanthemum ircutianum, 75; *leucanthemum*, 75–76
Cobbinshaw Reservoir, Midlothian (Field meetings 1968), 638–639
Cochlearia scotica, 506
Coleman-Cooke, J. (joint author with A. J. Willis)—Obituary: Dr F. R. Elliston Wright, 291–292
Coles, S. M. (appeal for material of *Ranuculus bulbosus* and *R. repens*), 644
Coles, S. M.—Studies in *Ranunculus acris* L. *sensu lato*, 505–506
Colorado (some plants from), 84
Coll, Isle of (Field meeting 1967), 298–299
Committee for the Study of the Scottish Flora: twelfth annual report to 31st December 1966 (by E. P. Beattie), 90–91
Committee for the Study of the Scottish Flora: thirteenth annual report to 31st December 1967 (by E. P. Beattie), 502–503
Condry, W. M.—Field Meetings 1967: Mochras, Merioneth, 303
Conolly, A.—The distribution of *Lamium album* in the British Isles, 72–73
Conservation Committee Notices, 518, 642
Conservation of the Oxlip (by A. J. Kerr) (notice of exhibit only), 78
Contemporary Flora of Cheshire (by A. Newton) (notice of exhibit only), 81
Corallorhiza trifida Chatel. at Roanhead, v.c. 69 (by R. E. Thomas), 193
Corley, V. H.—*Drycpteris filix-mas* agg. in Britain, 73–75
Corley, V. H., Jermy, A. C. and Kenneth, A. G.—Hybrids of *Dryopteris aemula*, 506
Corner, R. W. M.—Field Meetings 1967: Hawick, 299–300
Corner, R. W. M.—Plant notes: *Alchemilla glomerulans* Buser—in southern Scotland, 581
Corner, R. W. M.—Plant notes: *Carex appropinquata*—in Scotland, 563
Council (Reports of), 85–87, 497–499
Crabbe, J. A., Jermy, A. C. and Walker, S.—*Dryopteris dilatata* agg., 73
Currie, A.—Field Meetings 1967: Gordon Moss, 300
Cymerau Oakwood, 185, 187
Cytological and phytochemical studies in *Arenaria* and related genera (by Si Si) 512
Dartmoor (Wistmans Wood), 159–163
Davis, T. A. W.—Recording in Pembroke v.c. 45, 75
Davis, T. A. W.—Report of the Welsh Region Autumn Meeting, 1967, 295–296
de Lisle, W. (Boyd Watt), 624
de Vesian, D. E.—Obituary: Commander Russell Dudley-Smith (1912–1967), 623–624
Deschampsia setacea, 511
Dioecious species (key to), 15–17
Diplotaxis tenuifolius (on industrial waste), 296

Dipsacus fullonum (by Shephalbury School, Stevenage) (notice of exhibit only), 511
Dipsacus fullonum, 377–381
Distribution, dates of origin and acreage of *Spartina townsendii* (*s.l.*) marshes in Great Britain (by J. C. E. Hubbard and R. E. Stebbings), 1–7
Distribution of *Lamium album* in the British Isles (by A. Conolly), 72–73
Dony, J. G.—Additional notes on the flora of Bedfordshire, 523–535
Dony, J. G.—Obituary: Gordon Mark Leo Haskell, 496
Dony, J. G.—Presidential address 1968: the BSBI in a changing Britain, 311–323
Dony, J. G.—South-west Regional meeting, 1968, 628
Dony, J. G. and Allen, D. E.—Report of the Council for 1967, 497–499
Dorward, J. F. and Malloch, A. J. C.—Studies in *Chrysanthemum leucanthemum sensu lato*, 75–76
Dryas octopetala, 508
Dryopteris abbreviata (DC.) Newm. widespread in North Wales (by R. H. Roberts), 82
Dryopteris abbreviata 73–74; *aemula* (hybrids of) 506; *assimilis* 73, 506; *borreri* 73–75; *carthusiana*, 73; × *deweveri*, 73
Dryopteris dilatata agg. (by J. A. Crabbe, A. C. Jermy and S. Walker), 73
Dryopteris dilatata, 73, 506
Dryopteris filix-mas agg. in Britain (by H. V. Corley), 73–75
Dryopteris filix-mas, 73–74; '*incognita*' 74; *maderensis*, 73; *villarii*, 74
Dudley-Smith, Commander R. (obituary by D. E. de Vesian), 623–624
Dulas Valley, Montgomeryshire (Field meeting 1967), 303–304
Dumbarnie Links, Fife (Field meeting 1967), 299
Duncan, U. K.—Field Meetings 1967: Isle of Coll, 298–299
Duncan, U. K.—Field Meetings 1968: Isle of Tiree, 636–637
Duncan, U. K.—*Potamogeton* and *Groenlandia* species, 76
Durham (Field meeting 1968), 633–634
Ebudes (Flora project), 307, 519, 643
Ecology of Birch woods (by J. W. Kinnaird), 181–182
Ecology of some western oakwoods (by R. C. Steele), 185–187
Editors of *Watsonia*, 103, 308
Effects of altitude on plant growth (by J. B. Kenworthy), 508
Ellis, R. P.—Identification of *Agropyron*, 76
Elliston Wright, F. R. (obituary by A. J. Willis and J. Coleman-Cooke), 291–292
Empetrum hermaphroditum, 543; *nigrum* (keyed out), 17; *nigrum*, 542
Endemic flowering plants (Britain's), 506
English Box (*Buxus sempervirens*) and its forms (by Th. P. Beynes and C. R. Lancaster) (notice of exhibit only), 504
Epilobium hirsutum—pink flowered forms (by D. McClintock), 390
Equisetum fluviatile, 175; *fluviatile* (on industrial waste), 296; *laevigatum*, 175; *palustre*, 175; *pratense*, 175; *telmateia* (spiral shoots), 173–176
Erica ciliaris in Ireland (by D. McClintock), 79
Erica ciliaris, 177–178; *Lhibernica*, 79–80; *mackaiana*, 177; *mediterranea*, 80; × *praegeri*, 177; × *watsonii*, 177
Ericaulon aquaticum (*E. septangulare*) in Ardnamurchan (by D. McClintock), 509
Eriocaulon aquaticum, 505
Eriophorum gracile new to Ireland (by F. Rose), 83
Eriophorum gracile, 511
Erodium glutinosum (new to Coll), 298
Essex (recording in) (notice of exhibit only), 77
Euphrasia (on Foula), 540–541
Euphrasia stricta Lehm. in Guernsey (by P. F. Yeo), 383–385
Euphrasia tetraquetra, 383–385; *tetraquetra* × *stricta* 383
Everard, B.—Botanical paintings and stamp designs (notice of exhibit only), 506
Evergreen ornamentals planted or naturalised in the British Isles (by C. R. Lancaster), 78–79
Exhibition Meeting, 1966 (compiled by N. K. B. Robson), 71–84
Exhibition Meeting, 1967, 504–515
Ferry Hills, Fife (Field meeting 1967), 301
Ferryside, Carmarthenshire (Field meeting 1967), 303

Festuca unioloides, 392
Field Meeting: Norway August 1963 (by R. Mackechnie), 91–100
Field Meetings 1967, 297–304
Field Meetings 1968, 629–639
Flora of Berkshire (by H. J. M. Bowen) (notice of exhibit only) 504
Flora of Berkshire, by H. J. M. Bowen, F. B. Hora and E. W. Jones (reviewed by P. J. Wanstall), 621–622
Flora of Buckinghamshire (by P. Knipe) (notice of exhibit only), 78
Flora of Central Wales (by J. P. Savidge) (notice of exhibit only), 83
Flora of Hampshire (by M. P. Yule) (note on exhibit only), 84
Flora of Inishbofin and Inishshark (by D. A. Webb and J. Hodgson), 345–363
Flora of Rutland (by G. Messenger) (notice of exhibit only), 80
Flora of Skye (by R. I. Sworder) (note on exhibit only), 83
Flora of Somerset (note on progress only), 628
Flora of Surrey (by D. P. Young) (note on exhibit only), 84
Flora of West Lancashire (by E. F. Greenwood) (note on exhibit only), 76
Floristic survey of Yarner Wood National Nature Reserve (by D. L. Wigston), 514–515
Folan, A. C. M.—Field Meetings 1968: Cavan, 634
Folkestone Natural History Society (centenary publication), 519, 643
Foula (flora and vegetation of), 537–547
Frankland, B. (joint author with B. M. G. Jones)—Some plants from the Hautes Pyrénées, 77–78
Fraxinus excelsior (keyed out), 16
Fremlin, J. H.—Stereophotographs of Caryophyllaceae, 76
Fuller's Teasel (by P. N. Topham), 377–381
Fumaria occidentalis 506; *purpurea* 506
Further notes on *Erica ciliaris* in Ireland (by D. McClintock), 177–178
Galway (Field meeting 1968), 634
Gardiner, J. C.—Teesdale Defence Committee: interim report, 89
Gardiner, J. C.—Teesdale Defence Committee: report and accounts, 501
Geranium ibericum, 389; × *magnificum*, 389; *platypetalum*, 389
Gilbert, J. L.—Britain's endemic flowering plants, 506
Gilham, Dr Mary (on behaviour of maritime plants in different latitudes), 295–296
Glyceria distans var. *prostrata*, 507
Goodman, G. T. (on plant and environment of industrial waste), 296
Gordon Moss (Field meeting 1967), 300
Gosford Bay, East Lothian (Field meeting 1968), 638
Goss Moor, Cornwall (Field meeting 1967), 297
Graham, G. G.—Field Meetings 1968: Durham, 633–634
Great Horsetail (spiral shoots), 173–176
Great Orme (Field meeting 1967), 303
Green, H. E.—Plant notes: *Juncus squarrosus* L.—dispersal of seeds, 562
Greenslade, P. J. M—Note on Wistmans Wood, Dartmoor, 159–163
Greenwood, E. F.—Field Meetings 1967: The Lune Valley, Lancashire, 297–298
Greenwood, E. F.—Flora of West Lancashire (note on exhibit only), 76
Greenwood, E. F.—The British Herbarium of flowering plants and ferns at the City of Liverpool Museums, 169–172
Groenlandia, 76
Hamilton, N. M.—*Scrophularia peregrina* in Britain, 506–507
Hamilton, N. M. (joint author with P. Joslin)—What is a rare species?, 508
Hampshire (Field meeting 1968), 634
Hampshire (Flora of; Exhibition Meeting report), 84
Haskell, G. M. L. (obituary by J. G. Dony), 496
Hautes Pyrénées (Exhibition meeting report) 77–78
Hawick (Field meeting 1967), 299–300
Hawksworth, D. L.—Notes on the flora and vegetation of Foula, Zetland (v.c. 112), 537–547
Hedgerows (by M. Hooper), 77
Herefordshire, 84
Hervey, Canon G. A. K. (obituary by T. Small), 623
Heywood, V. H.—review of Walahfrid Strabo, Hortulus, 65
Hippophaë rhamnoides (keyed out), 16
Hodgson, J. (joint author with Webb,

D. A.)—The flora of Inishbofin and Inishshark, 345–363
Hooper, M.—Hedgerows, 77
Horsetail, Great (spiral shoots), 173–176
Hubbard, C. E. and Milne-Redhead, E.—A *Puccinellia* new to Britain, 507
Hubbard, J. C. E. & Stebbings, R. E.—Distribution, dates of origin and acreage of *Spartina townsendii* (*s.l.*) marshes in Great Britain, 1–7
Humulus lupulus (keyed out), 16
Hunt, P. F.—Field Meetings 1968: Isle of Purbeck, Dorset, 632–633
Hybrids of *Dryopteris aemula* (by V. H. Corley, A. C. Jermy and A. G. Kenneth), 506
Hybrids of *Mimulus cupreus* (by R. H. Roberts), 82
Hydrocharitaceae (keyed out), 15
Hydrocleis nymphoides (anatomy of), 513
Identification of *Agropyron* (by R. P. Ellis), 76
Ilex aquifolium (keyed out), 16
Illustrations of early vascula (by D. E. Allen), 71–72
Inchcailloch, 186–187
Industrial waste, 296
Inishbofin (Flora of), 345–363
Inishshark (Flora of), 345–363
Instructions to Contributors, 105–106, 309–310, 521–522
Interesting plants collected recently in Ireland (by Botany Section, Natural History Division, National Museum of Ireland), 511
Iona, 371
Ireland (interesting plants recently collected), 511
Iris pseudacorus (in salt marsh), 295
Iris pseudacorus (on industrial waste), 296
Irish Region report for 1966 (by J. J. Moore), 89
Irish Heather (by D. McClintock), 79–80
Isle of Man (*Lysimachia vulgaris* in), 390–391
Isle of Man (*Neotinea intacta* in) 165–168
Isle of Purbeck, Dorset (Field meeting 1968), 632–633
Italy (Junior Field Meeting 1968), 629-631
Jarrett, F. M.—Plant notes: *Pteris vittata* L., 387
Jermy, A. C.—*Carex* section *Acutae*, 77
Jermy, A. C.—*Carex stenolepis*—a problem sedge, 77
Jermy, A. C. (joint author with Corley, V. H. and Kenneth, A. G.)—Hybrids of *Dryopteris aemula*, 506
Jermy, A. C. (joint author with J. A. Crabbe and S. Walker)—*Dryopteris dilatata* agg., 73
Jermyn, S. T.—Recording of the Essex flora (notice of exhibit only), 77
Johnny's Wood S.S.S.I., 186–187
Jones, E. W.—Taxonomy of the British species of *Quercus*, 183–184
Jones, B. M. G.—The origin of the London Plane, 507–508
Jones, B. M. G. and Frankland, B.—Some plants from the Hautes Pyrénées, 77–78
Joslin, P. and Hamilton, N. M.—What is a rare species?, 508
Juncus bufonius, 513; *bufonius* subsp. *foliosus*, 511; *bulbosus*, 504; *bulbosus* × *kochii*, 504; *kochii*, 504
Juncus nodulosus var. *marshallii* (by M. McC. Webster), 84
Juncus ranarius in Britain? (by C. A. Stace and J. E. Lions), 513
Juncus squarrosus L.—Dispersal of seeds (by H. E. Green), 562
Juniperus communis subsp. *nana* Syme, 542
Kemp, R. F. O.—Plant notes: *Lloydia serotina* (L.) Reichb.—New locality in Radnorshire, v.c. 43, 391–392
Kenneth, A. G.—Field Meetings 1967: Somewhere in Argyll, 301
Kenneth, A. G. (joint author with Corley, V. H. and Jermy, A. C.)—Hybrids of *Dryopteris aemula*, 506
Kent, D. H. (compiler)—Abstracts from literature, 33–64, 201–290, 401–494, 567–614
Kent, D. H.—Review of Fitter, R., The Penguin Dictionary of British Natural History, 619
Kent, D. H.—Review of McClintock, D., Companion to Flowers, 66
Kenworthy, J. B.—The effects of altitude on plant growth, 508
Kerr, A. J.—Conservation of the Oxlip (notice of exhibit only), 78
Kertland, M. P. H.—The use and misuse of map-gridding, 508–509
Key to the identification of the male flowers of British dioecious species (by R. Tinklin), 15–17
Kiernan, J. A.—Field Meetings 1968: Tardebigge Reservoir and Roundhill Wood, Worcestershire, 632

Kinnaird, J. W.—Ecology of Birch woods, 181–182
Knipe, P.—The flora of Buckinghamshire (notice of exhibit only), 78
Lamium album (Exhibition Meeting report), 72–73
Lamium molucellifolium (on Coll), 298
Lammermuir Deans (Field meetings 1967), 300, 302
Lancaster, C. R.—Evergreen ornamentals planted or naturalised in the British Isles, 78–79
Lancaster, C. R. (joint exhibitor with Beynes, Th. P.)—The English Box (*Buxus sempervirens*) and its forms (notice of exhibit only), 504
Lawalrée, A., Flore Générale de Belgique: Spermatophytes, vol. 5, fasc. 1 (reviewed by J. E. Lousley), 66
Lean, A. L.—Variation in the British subspecies of *Rhinanthus minor* L., 509
Leaves from the 'Critical Supplement' (notice of exhibit only), 511
Leicestershire (Flora committee formation), 307, 519, 643
Lichen Society Distribution Maps Scheme, 307, 519, 643
Lilaea subulata (anatomy of), 513
Limnocharis flava (anatomy of), 513
Linaria repens (on industrial waste), 296; × *sepium* (in Lower Swansea Valley), 296; *vulgaris* (on industrial waste), 296
Linnaea borealis var. *americana*—at Seal, v.c. 16 (by J. E. Lousley), 192
Lions, J. E. (joint author with Stace, C. A.) —*Juncus ranarius* in Britain?, 513
List of members and subscribers, 107–141
Little Orme (Field meeting 1967), 303
Liverpool Conference (personalities at; notice of exhibit only), 504
Liverpool Museums, 169, 172
Lizard (Predannack Nature Reserve), 644
Llanstephan, Carmarthenshire (Field meeting 1967), 302
Lloydia serotina (L.) Reichb.—new Locality in Radnorshire, v.c. 43 (by R. F. O. Kemp), 391–392
Local Flora writers, 23–24
Local Floras currently available for sale (compiled by F. Perring), 615–617
Loiseleuria procumbens (on Foula), 545
London Natural History Society—Survey of *Calystegia* in the London area, 79
London Plane (origin of), 507–508
Lousley, J. E.—Obituary: John Ezra Woodhead, B.Sc., F.R.I.C., F.P.S. (1883–1967), 495–496
Lousley, J. E.—Plant notes: *Linnaea borealis* L. var. *americana* (Forbes) Rehder, 192
Lousley, J. E.—Plant notes: *Rumex hibernicus* Rech. f., 25
Lousley, J. E.—Plant notes: *Rumex pseudonatronatus* (Borb.) Murb., 25–26
Lousley, J. E.—Plant notes: *Rumex pseudonatronatus* (Borb.) Murb.—at Billinge Hill, Chester, v.c. 58, 561
Lousley, J. E.—Plant notes: *Saxifraga rotundifolia* L.—a well established alien in Britain, 189–191
Lousley, J. E.—Plant notes: *Spiraea chamaedryfolia* L., 189
Lousley, J. E.—Plant notes: *Trientalis borealis* Rab., 191
Lousley, J. E.—Review of Lawalrée A., Flore Générale de Belgique: Spermatophytes, vol. 5, fasc. 1, 66
Lundy Cabbage, 291
Lune Valley, Lancashire (Field meeting 1967), 297–298
Lysimachia vulgaris L.—in the Isle of Man (by D. E. Allen), 390–391
Lysimachia vulgaris 'var. *grandiflora*', 391
Mackechnie, R.—Field Meeting: Norway August 1963, 91–100
Macnair, V. J.—Field Meetings 1967: Dulas Valley, Montgomeryshire, 303–307
Malloch, A. J. C. (joint author with J. F. Dorward)—Studies in *Chrysanthemum leucanthemum* sensu lato, 75–76
Map-gridding, 508–509
Maps Scheme, 314–323
Marchant, N. G. (appeal for *Veronica* sect. *Beccabungae*), 103, 307, 519, 643
Marchant, N.—*Veronica* Section *Beccabungae*, 80
Marchant, N.—*Veronica* section *Beccabungae* (Exhibition Meeting report), 510–511
Matfield, B.—Natural hybridization in the British *Tormentillae*, 80
May, R. F.—Field Meetings 1967: Ferryside, Carmathenshire, 303
Mayo and Galway (Field meetings 1968), 634

McClintock, D.—*Aster macrophyllus* L. and *A. schreberi* Nees., 510

McClintock, D.—Bamboo seed, 510

McClintock, D., Companion to Flowers (reviewed by D. H. Kent), 66

McClintock, D.—*Erica ciliaris* in Ireland, 79

McClintock, D.—*Eriocaulon aquaticum* (*E. septangulare*) in Ardnamurchan, 509

McClintock, D.—Field Meetings 1968: Mayo and Galway, 634

McClintock, D.—Further notes on *Erica ciliaris* in Ireland, 177–178

McClintock, D. — *Pilosella flagellaris* (Willdenow) Sell and C. West subsp. *bicapitata* Sell and C. West, 509–510

McClintock, D.—Plant notes: *Asplenium billotii* × *Phyllitis scolopendrium* = × *Asplenophyllitis microdon*, 387–389

McClintock, D.—Plant notes: *Epilobium hirsutum* L.—pink flowered forms, 390

McClintock, D.—Plant notes: *Vinca major* L.—production of fruit, 191–192

McClintock, D.—Plant notes: *Vinca major* subsp. *hirsuta* (Boiss.) Stearn, 26

McClintock, D.—*Symphytum leonhartianum* Pugsley and *S. tuberosum* L., 509

McClintock, D.—The Irish Heather, 79–80

McClintock, D. and Yeo, P. F.—Plant notes: *Geranium ibericum* Cav., *G. platypetalum* Fisch. and Mey. and *G.* × *magnificum* Hyl., 389

McClure, J.—Field Meetings 1967: Stranraer, Wigtownshire, 298

McCosh, D.—Field Meetings 1967: Peebleshire, 301

McMullan, R.—Field Meetings 1968: North Tipperary, 635

Melderis, A.—Plant notes: *Bromus* (section *Ceratochloa*)—in Britain, 392–393

Mercurialis spp. (keyed out), 17

Messenger, K. G.—A railway Flora of Rutland, 325–344

Messenger, G.—Flora of Rutland (notice of exhibit only), 80

Miles, B. A.—*Poa alpina* L.—distribution in Britain, 193–194

Milne, J.—Field Meetings 1968: Gosford Bay, East Lothian, 638

Milne-Redhead, E. (joint author with Hubbard, C. E.)—A *Puccinellia* new to Britain, 507

Milne-Redhead, H. — Field Meetings 1968: Upper Nithsdale, 636

Mimulus cupreus × *guttatus* (on Coll), 299

Mochras, Merioneth (Field meeting 1967), 303

Moehringia (phytochemistry), 512

Monocotyledons (anatomy of), 513

Moore, J. J.—Irish Region report for 1966, 89

More about Mull (notice of exhibit only), 505

Morgan, B. M. C.—Obituary: Winifred Boyd Watt née de Lisle (1878–1968), 624–625

Morris, M.—Field Meetings 1967: Great and Little Orme, Caernarvonshire, 303

Mull (British Museum project), 102–103, 306–307, 518, 642

Mull (Exhibition Meeting report), 72

Mull (Field meetings 1968), 638

Mull (notice of exhibit only), 505

Mull (records), 365–372

Myerscough, P.—Field Meetings 1967: Threipmuir Common and Reservoir, Balerno, Midlothian, 301

Myrica gale (keyed out), 15

Narcissus obvallaris, 506

Najas marina (keyed out), 15

Natural hybridization in the British *Tormentillae* (by B. Matfield), 80

Nature Conservancy Biological Records Centre (notice of), 101, 305, 517, 641

Neotinea intacta (Link) Reichb. f. in the Isle of Man (by D. E. Allen), 165–168

Neotinea intacta (notice of exhibit only), 504

Network research, 553–559

Network research on *Silene vulgaris* (Moench) Garcke agg. (by J. P. Savidge) (notice of exhibit only), 511

Newton, A.—A contemporary Flora of Cheshire, 81

Nithsdale (Field meetings 1968), 636

North-East Regional Meeting, York, 1967 (by M. Briggs), 503

Norway (Field meeting 1963), 91–100

Note on Wistmans Wood, Dartmoor (by P. J. M. Greenslade), 159–163

Notebooks of Herefordshire plant records (by L. E. Whitehead), 84

Notes on the distribution of *Thlaspi alpestre* L. in Derbyshire (by D. W. Shimwell), 373–376
Notes on the flora and vegetation of Foula, Zetland (v.c. 112) (by D. L. Hawksworth), 537–547
Oak woods and Birch woods, 179–187
Obituaries, 67–69, 291–292, 495–496, 623–625
Ockendon, D. J., Walters, S. M. and Whiffen, T. P.—Variation within *Centaurea nigra* L., 549–552
Ockenden, D. J. and Whiffen, T.—*Centaurea nigra* L. (notice of exhibit only), 511
Ophrys apifera (in Isle of Man), 167
Origin of the London Plane (by B. M. G. Jones), 507–508
Ounsted, J.—review of Paton, J. A., Wild Flowers in Cornwall and the Isles of Scilly, 619–620
Oxlip (conservation of; notice of exhibit only), 78
Page, C. N.—Spiral shoots in the Great Horsetail, *Equisetum telmateia* Ehrh., 173–176
Parks, A. C.—Field Meetings 1967: The Chilterns, 297
Paton, A.—True Service Trees of Worcestershire, 9–13
Peebleshire (Field meeting 1967), 301
Pembroke (recording in), 75
Penguin Dictionary of British Natural History, by Richard Fitter (reviewed by D. H. Kent), 619
Perring, F. (compiler)—Local Floras currently available for sale, 615–617
Perring, F.—Supplement to a Guide for Local Flora Writers, 23–24
Perring, F. H.—'*Symphytum* survey', 81
Perring, F.—*Symphytum* survey, 553–556
Perring, F. H. and Sell, P. D.—Leaves from the 'Critical Supplement' (notice of exhibit only), 511
Personalia and notices to members, 101–103, 305–308, 517–520, 641–645
Personalities at the Liverpool Conference (by L. [T. sphalm.] Boulos) (notice of exhibit only), 504
Petasites (keyed out), 16
Pilosella flagellaris (Willdenow) Sell and C. West subsp. *bicapitata* Sell and C. West (by D. McClintock), 509–510
Pilosella flagellaris (Willd.) Sell and C. West subsp. *bicapitata* Sell and C. West—in Zetland (by W. Scott), 192–193
Plant notes, 25–26, 189–194, 387–393, 561–562
Plant records (compiled by E. C. Wallace), 127–132, 195–199, 395–400, 563–566
Plant records from Mull and the adjacent small islands (by J. F. M. Cannon and E. B. Bangerter), 365–372
Plants of Arran (by A. H. Sommerville), 512–513
Platanus × *hybrida* (origin of), 507–508; *orientalis*, 507–508
Poa alpina L.—distribution in Britain (by B. A. Miles), 193–194
Polygala oxyptera, 513; *serpyllifolia*, 514; *vulgaris*, 513–514
Polypodium australe (in Pembrokeshire), 75; *australe* (at Llanmadoc, S. Wales), 296; *interjectum* (new to Coll), 298
Potamogeton and *Groenlandia* species (by U. K. Duncan), 76
Potentilla anglica, 80; *erecta* 80; *reptans*, 80
Predannack Nature Reserve, The Lizard, Cornwall, 644
Presidential address 1968: The B.S.B.I. in a changing Britain (by J. G. Dony), 311–323
Primula scotica, 506
Pteridium aquilinum, 542
Pteridophytes (notice of exhibit only), 514
Pteris vittata, 387
Puccinellia capillaris (new to Britain), 507; *capillaris* 541; *distans*, 507
Puccinellia new to Britain (by C. E. Hubbard and E. Milne-Redhead), 507
Purbeck (Field meeting 1968), 632–633
Quercus petraea, 183–184, 185–187; *robur*, 183–184; *robur* (on Dartmoor), 159–163; *robur* (in Yarner Wood N.N.R.), 514–515
Railway Flora of Rutland (by K. G. Messenger), 325–344
Ranunculus acris (studies in), 505–506; *acris*, 542; *acris* subsp. *friesianus*, 505
Ranunculus bulbosus and *R. repens* (appeal for material), 644
Ranunculus granatensis, 505; *strigulosus*, 505
Rare species (what is?), 508
Recorders (changes to list), 644
Recording in Pembroke v.c. 45 (by T. A. W. Davis), 75

Recording of the Essex flora (by S. T. Jermyn), 77
Referees (changes to panel), 644–645
Report of the Council for 1966 (by E. B. Bangerter), 85–87
Report of the Council for 1967 (by J. G. Dony and D. E. Allen), 497–499
Report of the Welsh Region Autumn Meeting, 1967 (by T. A. W. Davis), 295–296
Rhamnus catharticus (keyed out), 16
Rhinanthus minor (variation in subspecies of), 509
Rhodiola rosea (keyed out), 16
Rhygen National Nature Reserve, 185–186
Rhynchosinapis monensis, 506; *wrightii*, 291, 506
Ribes alpinum (keyed out), 76
Richards, J.—Sexuality in *Taraxacum*, 81–82
Richards, A. J.—Some new British *Taraxacum* species (Exhibition Meeting report), 511
Roberts, R. H.—*Dryopteris abbreviata* (DC.) Newm. widespread in North Wales, 82
Roberts, R. H.—Hybrids of *Mimulus cupreus*, 82
Robson, N. K. B., compiler—Exhibition Meeting 1966, 71–84
Rosa (Durham field meeting), 633–634
Rose, F.—*Eriophorum gracile* new to Ireland, 83
Roses (by I. M. Vaughan) (notice of exhibition only), 83
Roundhill Wood, Worcestershire (Field meeting 1968), 632
Rubus (work by J. E. Woodhead), 495–496
Rumex (keyed out), 17
Rumex hibernicus, 25; *longifolius*, 561
Rumex pseudonatronatus (by J. E. Lousley), 25–26
Rumex pseudonatronatus (Borb.) Murb.—at Billinge Hill, Chester, v.c. 58 (by J. E. Lousley), 561
Rumex × *wrightii*, 291
Ruscus aculeatus (keyed out), 15
Rutland (Flora of; notice of exhibit only), 80
Rutland (railway flora of), 325–344
Salicaceae (keyed out), 15, 16
Sasa palmata, 510
Savidge J. P.—Campion enquiry, 557–559.
Savidge, J. P.—Flora of Central Wales (notice of exhibit only), 83
Savidge, J. P.—Network research on *Silene vulgaris* (Moench) Garcke agg. (notice of exhibit only), 511
Saxifraga hartii, 506
Saxifraga rotundifolia L.—a well established alien in Britain (by J. E. Lousley), 189–191
Scheuchzeria palustris (anatomy of), 513
Scirpus (appeal for material), 103, 308, 520, 643
Scott, W.—Plant notes: *Pilosella flagellaris* (Willd.) Sell & C. West subsp. *bicapitata* Sell & C. West—in Zetland, 192–193
Scrophularia peregrina in Britain (by N. M. Hamilton), 506–507
Seatoller SSSI, 186–187
Sedges (review), 620–621
Sennitt, B. F. C. (joint author with Warde, A. S.)—Some temperate zone Pteridophytes (short note of exhibit only), 514
Serratula tinctoria (keyed out), 16
Service Tree, 9–13
Sexuality in *Taraxacum* (by J. Richards), 81–82
Shapwick, Dorset (*Scrophularia peregrina*), 506–507
Shephalbury School—*Dipsacus fullonum* (notice of exhibit only), 511
Shepherd, Henry, 169–170
Shepherd, John, 169
Shetland (flora of Foula), 537–547
Shetland, Mouse-ear Hawkweed, 192–193
Shetland (*Pilosella flagellaris* in), 510
Shillito, James, 169–171
Shimwell, D. W.—Notes on the distribution of *Thlaspi alpestre* L. in Derbyshire, 373–376
Si Si—Cytological and phytochemical studies in *Arenaria* and related genera, 512
Sigesbeckia, 19–21, 72; *S. cordifolia*, 19; *microcephala*, 19, 21; *orientalis*, 19, 20
Silene (appeal for material), 103, 308, 519, 643
Silene (Exhibition Meeting report), 72
Silene alba (keyed out), 17; *alba* (new to Coll), 299; *dioica* (keyed out), 17; *maritima*, 557–559; *vulgaris*, 557–559; *vulgaris* (notice of exhibit only), 511
Sinker, C. A.—review of Jermy, A. C. and Tutin, T. G., British Sedges, 620–621

Skye (Flora of), 83
Slack, A.—Field Meetings 1968: Isle of Mull, 638
Small, J. — Obituary: Canon George Aidan Kingsford Hervey (1893–1967), 623
Smith, A. J. E. — Obituary: Dr E. F. Warburg, 67–69
Some new British *Taraxacum* species (by A. J. Richards), 511
Some plants from Colorado and Arizona (by L. S. Whicher), 84
Some plants from the Hautes Pyrénées (by B. M. G. Jones and B. Frankland), 77–78
Some temperate zone Pteridophytes (by A. S. Warde and B. F. C. Sennitt), 514
Somerset, Flora of, 628
Sommerville, A. H.—Plants of Arran, 512–513
Sorb tree, 9–13
Sorbus domestica (in Worcestershire), 9–13)
South-west Regional Meeting, 1968 (by J. G. Dony), 628
Sparganium minimum (new to Coll), 298
Spartina pectinata, Link in Ireland (by P. J. Boyle), 505
Spartina townsendii, 1–7
Spearing, J. K. (appeal for *Scirpus* material), 103, 308, 520, 643
Specialists (changes to panel), 644–645
Spiraea chamaedryfolia, 189; *ulmifolia*, 189
Spiral shoots in the Great Horsetail, *Equisetum telmateia* Ehrh. (by C. N. Page), 173–176
Spiranthes spiralis (in Isle of Man), 167
Stace, C. A. and Lions, J. E.—*Juncus ranarius* in Britain?, 513
Stamp designs (notice of exhibit only), 506
Stant, M. Y.—Anatomical structure of aquatic monocotyledons, 513
Stanner Rocks (*Lloydia serotina*), 391–392
Stebbings, R. E. (joint author with Hubbard, J. C. E.)—Distribution, dates of origin and acreage of *Spartina townsendii* (*s.l.*) marshes in Great Britain, 1–7
Steele, R. C.—Ecology of some western oakwoods, 185–187
Stereophotographs of Caryophyllaceae by J. H. Fremlin (brief notice only), 76
Stonehouse (Field meeting 1968), 635
Stranraer, Wigtownshire (Field meeting 1967), 298
Studies in British *Polygala* species (by I. C. Trueman), 513–514
Studies in *Chrysanthemum leucanthemum sensu lato* (by J. F. Dorward and A. J. C. Malloch), 75–76
Studies in *Ranunculus acris* L. *sensu lato* (by S. M. Coles), 505–506
Supplement to a Guide for Local Flora Writers (by F. Perring), 23–24
Surrey (Flora of), (note on exhibit only), 84
Survey of *Calystegia* in the London area (by London Natural History Society), 79
Switzerland and Italy (Junior Field Meeting 1968), 629–631
Sworder, R. I.—A Flora of Skye, 83
Symphytum, 503; *asperum*, 553; *bulbosum*, 556; *caucasicum*, 556; *grandiflorum*, 556; *leonhardtianum*, 556
Symphytum leonhartianum Pugsley and *S. tuberosum* L. (by D. McClintock), 509
Symphytum officinale, 553; *officinale* var. *ochroleucum*, 555; *officinale* var. *patens*, 555; *officinale* var. *purpureum*, 555; *orientale*, 556
'*Symphytum* survey' (by F. H. Perring), 81
Symphytum survey (by F. Perring), 553–556
Symphytum tuberosum, 509, 556; × *uplandicum*, 553–555
Synnott, D.—Field Meetings 1968: Boyne Valley, 635
Synthesised *Juncus bulbosus* × *kochii* (by P. M. Benoit and D. E. Allen), 504
Tamus communis (keyed out), 16
Taraxacum (appeal for material), 518–519, 642–643
Taraxacum (new species in) (Exhibition Meeting report only), 511
Taraxacum (sexuality in), 81; *austriacum*, 81; *brachyglossum*, 81; *hamatum*, 81; *isophyllum*, 81; *lainzii* (on Clare Island), 634; *polyodon*, 81
Tardebigge Reservoir and Roundhill Wood, Worcestershire (Field meeting 1968), 632
Taxonomy of the British species of *Quercus* (by E. W. Jones), 183–184
Teasel (Fuller's), 377–381
Teasel (notice of exhibit only), 511

Teesdale Defence Committee: interim report (by J. C. Gardiner), 89
Teesdale Defence Committee: report and accounts (by J. C. Gardiner), 501
Thamnocalamus falconeri, 510
Thlaspi alpestre (in Derbyshire), 373–376
Thomas, R. E.—*Corallorhiza trifida* Chatel. at Roanhead, v.c. 69, 193
Threats to British flora, 101–102, 306
Three species of *Sigesbeckia* in Britain (by R. K. Brummitt), 19–21
Threipmuir Common and Reservoir, Balerno, Midlothian (Field meeting 1967), 301
Tinklin, R.—A key to the identification of the male flowers of British dioecious species, 15–17
Tipperary (Field meeting 1968), 635
Tiree (Field meeting 1968), 636–637
Tomintoul and Ben Avon (Field meeting 1967), 300
Topham, P. N.—The Fuller's Teasel, 377–381
Towy Valley (Field meeting 1967), 302
Toxic spray damage, 102, 306
Transplant and introduction experiments, 102, 306
Trientalis borealis, 191; *europaea*, 191
Trinia glauca (keyed out), 16
Trist, P. J. O.—Field Meetings 1968: Bury St. Edmunds, 632
True Service Trees of Worcestershire (by A. Paton), 9–13
Trueman, I. C.—Studies in British *Polygala* species, 513–514
Tynninghame Bay, Dunbar, East Lothian (Field meeting 1967), 302
Ulmus coritana, 506; *plotii*, 506
Urtica dioica (keyed out), 16
Use and misuse of map gridding (by M. P. H. Kertland), 508–509
Valeriana dioica (keyed out), 17
Variation in the British subspecies of *Rhinanthus minor* L. (by A. L. Lean), 509
Variation within *Centaurea nigra* L. (by D. J. Ockendon, S. M. Walters and T. P. Whiffen), 549–552
Vascula (illustrations of), 71–72
Vaughan, I. M.—Field Meetings 1967: Llanstephan, Carmarthenshire, 302
Vaughan, I. M.—Field Meetings 1967: Upper Towy Valley, 302
Vaughan, I. M.—Roses (notice of exhibit only), 83
Vaughan, I. M.—Welsh Region report for 1965–1966, 89–90
Vaughan, I. M.–Welsh Region report for 1967–1968, 627
Veronica americana, 511; *anagallis-aquatica* 80, 510
Veronica anagallis-aquatica × *catenata*—at Meonstoke, Hampshire (by R. V. Wells), 391
Veronica anagalloides, 80, 511; *beccabunga*, 80, 511; *catenata*, 80, 510; *montioides*, 80
Veronica section *Beccabungae* (by N. Marchant) (report of exhibit), 80
Veronica section *Beccabungae* (by N. Marchant) (report of exhibit), 510–511
Veronica section *Beccabungae* (appeal for material), 103, 307, 519, 643
Vinca herbacea, 26
Vinca major L.—production of fruit (by D. McClintock), 191–192
Vinca major subsp. *hirsuta*, 26
Virginia Water (Field meeting 1968), 632
Viscum album (keyed out), 15
Walahfrid Strabo, Hortulus (reviewed by V. H. Heywood), 65
Walker, S. (joint author with J. A. Crabbe and A. C. Jermy)—*Dryopteris dilatata* agg., 73
Wallace, E. C. (compiler)—Plant records, 27–32
Wallace, E. C. (compiler)—Plant records, 195–199
Wallace, E. C. (compiler)—Plant records, 395–400
Wallace, E. C. (compiler)—Plant records, 563–566
Walters, S. M.—*Betula* L. in Britain, 179–180
Walters, S. M. and Boznan, V. G.—*Alchemilla faeroensis* (Lange) Buser and *A. alpina* L., 83
Walters, S. M. (joint author with Ockendon, D. J. and Whiffen, T. P.)—Variation within *Centaurea nigra* L., 549–552
Wanstall, P. J.—review of Bowen, H. J. M., Hora, J. B. and Jones, E. W., The Flora of Berkshire, 621–622
Warburg, E. F. (obituary by A. J. E. Smith), 67–69
Warde, A. S. and Sennitt, B. F. C.—Some temperate zone Pteridophytes (short note of exhibit only), 514

Watsonia, 101, 103, 308, 520, 641
Watsonian vice-county system, 314–323
Webb, D. A. and Hodgson, J.—The flora of Inishbofin and Inishshark, 345–363
Webster, M. McC.—*Juncus nodulosus* var. *marshallii*, 84
Webster, M. McCallum—Field Meeting 1967: Tomintoul and Ben Avon, 300
Wells, R. V.—Plant notes: *Veronica anagallis-aquatica* × *catenata*—at Meonstoke, Hampshire, 391
Welsh Region report for 1965–1966 (by I. M. Vaughan), 89–90
Welsh Region report for 1967–1968 (by I. M. Vaughan), 627
West Lancashire (Flora of), 76
What is a rare species? (by P. Joslin and N. M. Hamilton), 508
Whicher, L. S.—Some plants from Colorado and Arizona, 84
Whiffen, T. P. (joint author with Ockendon, D. J. and Walters, S. M.)—Variation within *Centaurea nigra* L., 549–552
Whitehead, L. E.—Notebooks of Herefordshire plant records, 84
Whitty Pear, 9–13
Wigston, D. L.—A floristic survey of Yarner Wood National Nature Reserve, 514–515
Wild Flowers in Cornwall and the Isles of Scilly, by Jean A. Paton (reviewed by J. Ounsted), 619–620
Willis, J. J. and Coleman-Cooke, J.—Obituary: Dr F. R. Elliston Wright, 291–292
Wistmans Wood, Dartmoor, 159–163
Woodhead, J. E. (obituary by J. E. Lousley), 495–496
Worcestershire (*Sorbus domestica* in), 9–13
Wright, F. R. Elliston (obituary by A. J. Willis and J. Coleman-Cooke), 291–292
Yarner Wood National Nature Reserve, 514–515
Yeo, P. F.—*Euphrasia stricta* Lehm. in Guernsey, 383–385
Young, D. P.—The Flora of Surrey, 84
Yule, M.P.—Field Meetings 1968: Hampshire, 634
Yule, M. P.—Flora of Hampshire (Exhibition Meeting report), 84
Zetland (flora of Foula), 537–547